APPENDICES

APPENDIX A

Policies and Procedures

Use of Mercury-Free Devices

Introduction:

Mercury and mercury-containing devices have historically been used in laboratories and shops to measure temperature, pressure, liquid density, and humidity. Other common sources of mercury include fluorescent bulbs and some electric switches.

To minimize health and environmental risks, items containing mercury must be handled safely and disposed of properly when damaged or no longer in use. Improper handling, breakages and spills may result in avoidable exposures and/or require extensive cleanup efforts.

Mercury spills from broken thermometers are the most common type of hazardous material cleanup on campus. Broken thermometers are also a source of potential mercury discharge to the sanitary sewer system. Spilled elemental mercury may hide within lab ovens and refrigerators and under benches. Mercury dumped into sink drains may accumulate in the drain and continuously emit vapors or be spilled during plumbing or construction work.

Policy

It is ESF's policy to reduce health risks and prevent environmental pollution from elemental mercury by implementing a mercury-free purchase policy. Devices containing mercury will no longer be purchased or otherwise acquired. ESF will also eliminate elemental mercury and mercury containing devices wherever possible by identifying containers and replaceable apparatus, and assuring proper disposal. For devices and apparatus currently in use, the College will promote the use of non-mercury containing devices by coordinating a mercury device collection and exchange program. The Environmental Health and Safety Office will consider requests to contribute 50 percent of the purchase price toward replacements when mercury-containing devices are exchanged for devices that are mercury-free. Contact the Environmental Health and Safety Office at 315-470-6896 for more information.

Exceptions to the mercury-free purchase policy may be granted provided the purchaser demonstrates the lack of a viable mercury-free alternative device or method to the Environmental Health and Safety Office. All purchase requests of this nature are to be forwarded to Environmental Health and Safety for review/prior approval before submitting to the Purchasing Department for procurement purposes. Any irreplaceable use of mercury must be done in a safe manner consistent with ESF's Laboratory Safety Guide and Chemical Hygiene Plan.

All campus facilities must work toward becoming virtually mercury-free by eliminating all non-essential mercury-containing devices and equipment. The Analytical and Technical Services Stockroom maintains an inventory of mercury-free thermometers. Other locations for examples of mercury-free alternatives that can be explored include Ever-Safe non-toxic thermometers (http://www.ertco.com) and Enviro-Safe non-toxic thermometers (http://www.vwrsp.com/).

APPENDIX B

ESF HAZARDOUS CHEMICAL LABELING PROGRAM

A. Label Requirements

The Federal Hazard Communication Standard requires that all chemicals sold to ESF contain the following: the identity of the chemical, the appropriate warnings, the name and address of the manufacturer. These labels should not be removed or defaced. If a chemical is in its original container, there are no other label requirements.

All chemical containers (regardless of hazard) must be labeled during use and storage. A chemical that has been transferred from its original container to another must be labeled with the name of the chemical and manufacturer, the date on original container, hazard warning and person responsible.

Each **Laboratory Director** is designated to ensure that all hazardous chemicals used in their areas are properly labeled. The hazard warning can be words, pictures, or symbols that provide an immediate understanding of the primary health and/or physical hazard(s) of the material, and the appropriate personal protective equipment to be used while handling the chemical. The **Laboratory Director** is responsible for reviewing the relevant hazards of the chemical and ensuring that the labels are updated.

The National Fire Protection Association (NFPA) diamond labeling system is being used by various chemical manufacturers and may appear on Material Safety Data Sheets. With minimal training, the type and extent of the hazard is easily recognizable.

Each diamond of a NFPA label addresses a specific area of concern for an individual chemical's classification. The **blue** diamond is devoted to health effects, the **red** diamond concerns flammability, the **yellow** diamond represents reactivity, and the **white** diamond is reserved for special information.

A Numerical Code is used to represent the extent of the hazard for each of the chemical classifications. The scale ranges from 0 to 4. The rating **0** is **non-hazardous, 1** is **slightly** hazardous, **2** is **moderately** hazardous, **3** is **significantly** hazardous, and **4** is **highly** hazardous.

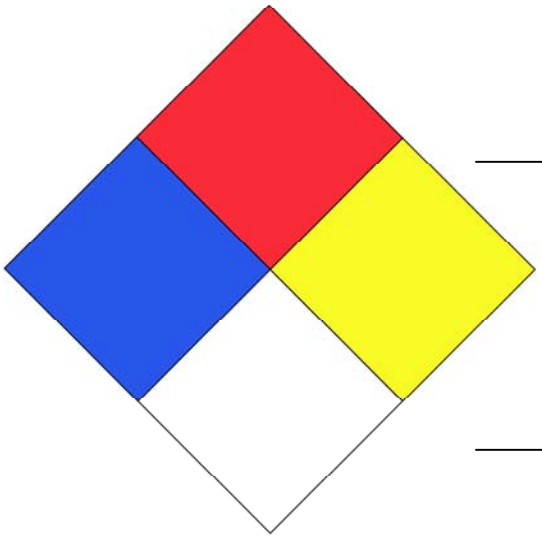
The labels for use at ESF are available from the **Chemical Hygiene Officer** and Central Supply. They include the NFPA diamond label and a "Hazardous Waste" label. The NFPA label provides a convenient way to ensure easily recognized information on the physical and health effects of the chemical and recommended personal protective equipment. Additional space is reserved for special warnings or instructions. Both types of labels are displayed below.

Color Hazard Codes

Blue = Health Effects
Red = Flammability
Yellow = Reactivity
White = Special Information

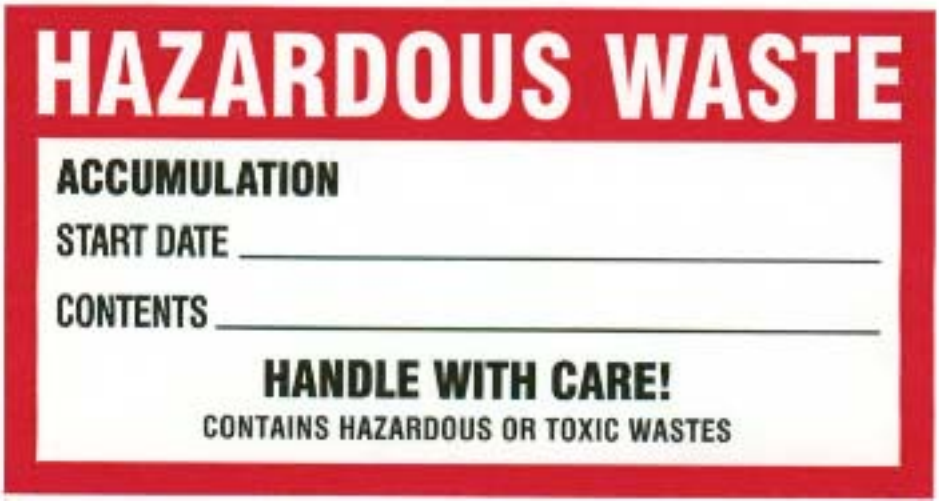
Numeric Hazard Codes

0 = Non-Hazardous
1 = Slightly
2 - Moderately
3 = Significantly
4 = Highly



CHEMICAL

OWNER **DATE**



B. Labeling Exemptions and Alternatives

There are four situations that are exempted from or allow alternatives to, the labeling requirement: (1) containers labeled under other federal laws, (2) portable containers, (3) laboratories, and (4) stationary containers.

1. Containers Labeled Under Other Federal Laws

SOME LABELS REQUIRED BY OTHER AGENCIES

Agency	Authority	Jurisdiction
Environmental Protection Agency	Federal Environmental Pesticide Control Act (formerly FIFRA)	Insecticides, Fungicides Rodenticides
Consumer Product Safety Commission	Federal Hazardous Substances Labeling Act	Packaging and labeling of food, drugs, cosmetics and medical devices
Bureau of Alcohol, Tobacco, and Firearms	Federal Alcohol Administration Act	Distilled beverages, wine, and malt beverages

Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)

2. Portable Containers

Portable containers into which hazardous chemicals are transferred from labeled containers and which are intended only for the immediate use of the employee performing the transfer are exempt from the labeling requirements of the College. Hazardous chemicals left in portable containers beyond the employee's work shift must be labeled according to the standard. This labeling exemption is intended to prevent the ineffective use of labels for certain activities, such as the few ounces of a pesticide or fertilizer placed in a hand-held spray applicator. However, labels may be appropriate for any container where confusion may subsequently occur if it is not properly labeled.

3. Laboratories

Laboratories receive different treatment in terms of the College's labeling requirements. The issue of what and when to label becomes more complicated in a laboratory since more than one chemical is often combined to create stock solutions, buffers, washing solutions, and other specialized reagents. In most cases it is easiest to refer to these mixtures by using a cryptic code.

Since personnel outside of this laboratory are not going to be aware of these codes, provisions have been made to post a code sheet within the laboratory **(see Appendix C).** Whenever a code is used, it must be noted on the list. Codes no longer used can be crossed off the list.

Laboratories only - containers such as test tubes, flasks, beakers, and Petri plates need not be labeled with an identity and hazard warning. However, good scientific method dictates that labeling and record keeping be kept current.

4. Stationary Containers and Vessels

Alternative methods of labeling such as signs, placards, and other written forms of warning, are permitted in lieu of affixing labels to individual stationary process containers. Sometimes, stationary containers (e.g., reaction vessels, storage tanks) may be used for several different materials. It is not necessary to re-label the container each time the contents change. Signs, placards or batch/process sheets can be placed or posted in close proximity to the container. The alternative method of labeling must provide the same information as a label--the substance identity and the primary hazard(s). Moreover, affected employees must be informed (as part of their hazard communication training) of the alternative labeling methods used in their work areas.

APPENDIX C

Chemical Code Sheets

In order to simplify the demands on research and instructional staff and students, for the proper labeling of laboratory stock solutions, the College of Environmental Science and Forestry requires the use of **Chemical Code Sheets (CCS)** in accordance with the applicable federal regulations.

The **CCS** indicates the code being used, the ingredients in the mixture, and appropriate hazard warning. The **CCS** shall be posted in obvious areas where codes are used to label chemical containers.

The **CCS** are running lists that must be updated as needed. Simply cross out mixtures no longer in use and add the information about any new coded mixtures.

Your cooperation will add the safety of all persons and reduce the need for more cumbersome labeling procedures to maintain our compliance with federal regulations.

A sample copy of a **CCS** is attached for your convenience. If you have any questions contact the **Chemical Hygiene Officer x6964.**

SUNY College of Environmental Science and Forestry

CHEMICAL CODE SHEET

Department _____

Location: _____

Laboratory Director _____ Phone _____

CODE	INGREDIENTS	HAZARD

HAZARD

CO = Corrosive	CA = Carcinogenic
IR = Irritant	PA = Pathogenic
FL = Flammable	RA = Radioactive
RE = Reactive	EX = Explosive
NO = None	TO = Toxic

APPENDIX D

LABORATORY VENTILATION

The best way to prevent or reduce exposure to airborne substances is to control their escape into the work environment by the use of laboratory hoods and other ventilation systems.

The two basic types of laboratory ventilation are general dilution and local exhaust ventilation.

A. General Dilution Ventilation (GDV)

General dilution ventilation refers to the quantity and quality of air supplied, for example, exchanging indoor room air with outdoor air. Laboratory air should be replaced continuously, approximately 6 to 12 air changes per hour, so that the concentration of air contaminants are continuously diluted.

General dilution ventilation should **NOT BE RELIED ON FOR PROTECTION FROM TOXIC SUBSTANCES RELEASED INTO THE LABORATORY.** It provides only modest protection against toxic gases, vapors, aerosols, and dusts. It is an inefficient way to control highly toxic contaminants because of the amount of air exchange necessary to achieve dilute concentrations within acceptable ranges.

Laboratory air should not be recycled. GDV is intended to increase the comfort of the laboratory environment and to serve as a source of air-flow through the ventilation system and through dedicated systems, such as fumehoods.

Typical uses for GDV include:

1. Heating, cooling, and humidity control.

2. Dilution of products of respiration, pathogens and odors caused by normal human occupancy.

3. Dilution of low levels of slightly toxic gases or solvent vapors.

4. Dilution of combustible vapors to concentrations below the lower explosive limits.

B. Local Exhaust Ventilation (LEV)

Local Exhaust Ventilation is a system designed to exhaust contaminants captured near their source without allowing them to escape and disperse into the laboratory atmosphere. Laboratory hoods use LEV to prevent harmful dusts, mists, fumes as well as toxic gases and vapors from entering the laboratory.

Laboratory hoods offer other types of protection as well. A chemical reaction system located within a hood, with the hood sash correctly lowered, places a physical barrier between the worker and the chemical reaction system. This physical barrier will provide protection from hazards such as chemical splashes, spills, sprays, fires and minor explosions from an uncontrolled reaction.

C. Other Local Ventilation Devices

Ventilated storage cabinets, canopy hoods, snorkels and other such devices should be provided as needed. Each canopy hood and snorkel should have a separate exhaust duct.

1. Ductless Hoods

   A ductless chemical hood is useful in areas where a ducted chemical hood is not available or is dedicated to another purpose. These devices should only be used under the conditions for which they are designed. The operation manual should be consulted prior to using such a hood and provisions should be made to ensure that the unit is properly maintained and serviced. In general, a ductless hood should not be used for chemical storage, hazardous operations or continuous operation.

2. Special Ventilation Areas

   Exhaust air from glove boxes and isolation rooms should be passed through scrubbers or treated by other methods before release into other exhaust systems. Cold rooms and warm rooms should have provisions for rapid escape in the event of equipment or electrical failure.

3. Modifications

   Any modification of the existing ventilation system is permitted only if the proper function of the system is not compromised, and the laboratory environment continues to be protected from hazardous airborne substances.

   Before any modifications are performed, the **Laboratory Director** shall consult with the Director of Physical Plant and the Chemical Hygiene Officer.

4. Quality

   Air flow through the laboratory should be relatively uniform throughout with no high velocity or static areas. Air flow into and within a fume hood should be uniform.

   All laboratory fume hoods are tested annually and maintained to ensure adequate flow.

5. Evaluation

   The ventilation system must be evaluated on installation. Physical Plant and the Chemical Hygiene Officer must conduct all evaluations**.**

6. Inspections

   Local exhaust ventilation systems should be thoroughly inspected on a regular basis, at least annually, and when any problem is noted. Inspections should include all the associated equipment as well as a review of the operation, exposure level measurements and air flow measurements.

7. Installation and Maintenance

   With proper design, use and maintenance of ventilation systems, occupational health hazards can be minimized. Consulting engineers, and vendors should be chosen from those having broad experience in designing ventilation systems for health hazard control. Plans for modification or new installations must be reviewed and approved by Physical Plant and the Chemical Hygiene Officer.

   Before any new installations or modifications are performed, the Laboratory Director shall consult with the Director of Physical Plant and the Chemical Hygiene Officer.

APPENDIX E

CHEMICAL SPILL POLICY

Employee and Student procedure in the event of a chemical spill or release of toxic or hazardous material into the atmosphere:

1. Notify others in the area of the spill or release of the potential danger. Suggest/order evacuation if the circumstances so indicate. **Pull** the **fire alarm** if warranted by the seriousness of the situation.

2. Call ESF University Police at **x6666**.

3. Give the following information to the University Police communicator:

   a) your name
   b) your phone number
   c) the nature of the incident
   d) the location of the incident (building, room number, floor, etc.)
   e) the type of substance (if known)
   f) the quantity of substance (estimate)
   g) the hazards (flammable, explosive, toxic - if known)
   h) suggest the safest place to meet the University Police and Chemical Hygiene Officer who will be responding
   i) advise if you feel the Fire Department should be notified
   j) advise if there are any injuries and if an ambulance is needed

DO NOT expose yourself unnecessarily to any unknown substances.

Use caution and remember some toxic substances have no detectable odor.

APPENDIX F

CHEMICALS ESTABLISHED AS HAZARDOUS

According to the OSHA Hazard Communication Standard (1910.1200), a hazard determination must consider the chemicals listed in the following sources to be hazardous:

- Chemicals regulated by OSHA in 29 CFR Part 1910, Subpart Z.
- Threshold Limit Values for Chemical Substances and Physical Agents in the Work Environment, American Conference of Government Industrial Hygienists (latest edition).
- National Toxicology Program, Annual Report on Carcinogens (latest edition).
- International Agency for Research on Cancer Monographs (latest edition).

The fact that a chemical is not listed does *not* mean it is not hazardous. Any chemical that presents a potential health or physical hazard to which employees may be exposed must be included in the hazard communication program.

Conversely, some of the substances listed present no danger at the exposure levels likely to be encountered at ESF. Consult the MSDS for the specific chemicals in question.

The United States Environmental Protection Agency, and the New York State Department of Environmental Conservation regulate hazardous waste. For definitions to identify, as well as manage hazardous waste, see **Appendix L**.

APPENDIX G

COMPRESSED GAS CYLINDERS

Compressed gases are used throughout the College of Environmental Science and Forestry. Regardless of the use or content of the cylinder, compressed gas cylinders represent a serious health and safety hazard. An improperly handled cylinder may result in serious injury or death through the sudden release of its contents. A flammable gas suddenly released into an area may cause a fire and explosion. Toxic or reactive gas suddenly released into an area may cause asphyxiation. Even a "harmless" gas could create such high concentrations that it would be impossible to breathe. Also, a compressed gas cylinder is a potential projectile or bomb if not properly secured.

A. General Guidelines for Handling Compressed Gases

These guidelines must be followed for all compressed gas cylinders used at ESF.

1. Cylinders must be firmly secured at all times using straps, chains, or clamps. Cylinders are to be located away from traffic areas and clearly labeled as to their contents.

2. The correct cylinder valve is to be used for the particular gas in use. Valve threads may be right-handed for non-fuel gases and left-handed for fuel gases. Cylinders not in use must be capped.

3. Transport gases with an approved cart or hand truck. Never roll or scoot a gas cylinder. Do not lift cylinders by the cap.

4. Keep an unregulated cylinder valve closed at all times. Open the main valve only to the extent necessary and regulate the gas flow using the regulator. Ensure adequate ventilation and precaution when using hazardous gases. Report leaking gas cylinders to University Police **(x6666)** and Laboratory Director.

5. All cylinders must be clearly marked with the name of the contents.

6. Do not use oil, grease or lubricants on valves, regulators or fittings.

7. Do not attempt to repair damaged cylinders or to force frozen cylinder valves.

8. Before moving the regulator, close cylinder valve first, then release all pressure from the regulator.

9. Cylinders that are not necessary for current needs shall be stored in a safe location outside the laboratory work area.

10. Purchase only reusable/refillable cylinders.

B. Flammable Gases

Special care must be taken when flammable gases are used in confined spaces.

1. No more than two cylinders should be manifolded together. Several instruments or outlets are permitted for a single cylinder.

2. No more than one cylinder of a highly flammable gas may be in a room without specific review by the Laboratory Director and Chemical Hygiene Officer.

3. Cylinder size is limited to 300 cubic feet.

4. Valves on all flammable gas cylinders shall be shut off when the laboratory is unattended.

C. Attaching Regulators

1. Cylinder throats and surfaces must be clean and tightly fitted. Do not lubricate.

2. Tighten regulators and valves firmly with the proper sized wrench. (Do not use pliers. They many damage the nuts.) Do not force fittings to ensure a tight seal.

3. Open valves slowly. Do not stand directly in front of gauges (the gauge face may blow out). Do not force valves that "stick."

4. Check for leaks at connections. Leaks are usually due to damaged faces at the connections or improper fittings. Do not attempt to force an improper fit. (It may only damage a previously undamaged connection and compound the problem.)

5. Valve handles must be left attached to the cylinders.

6. The maximum rate of flow should be set by the high-pressure valve on the cylinder. Fine-tuning of flow should be regulated by the needle valve.

7. Shut off cylinder when not in use.

D. Leak Testing

Cylinders and connections should be tested by SNOOP™ or a soapy water solution. Test the cylinders before regulators are attached and again after the regulators or gauges are attached.

E. Empty Cylinders

1. Must be marked empty.
2. Must be returned promptly.
3. Must have valve safety caps replaced.

F. Cryogenic Liquids

1. Store in well-ventilated area to prevent displacement of air.
2. Use only approved storage vessels having fittings to relieve pressure
3. Always wear eye protection, preferably a face shield.
4. Always wear hand protection, preferably heavily insulated gloves.

APPENDIX H

PERSONAL PROTECTIVE EQUIPMENT PLAN

For

SUNY ESF

Purpose: To assess physical, chemical, and light radiation hazards in our work environment and to select and provide appropriate personal protective equipment (PPE) to help prevent injury from these hazards in accordance with OSHA 1910.132.

Notes: Protective equipment alone shall not be relied upon to provide protection against hazards, but will be used in conjunction with guards, engineering controls, and sound safety practices. This plan is not intended to conflict with, but is to address safety concerns not covered by our Respiratory Protection, Lead in Construction, Bloodborne Pathogens, Logging Safety, Confined Space Entry and Laboratory Safety Plans. Questions with regard to specific hazards, levels of risk, and type of PPE should be referred to your supervisor, EH&S, and MSDS' when appropriate.

HAZARD ASSESSMENTS and REQUIRED PROTECTION

Type of Hazard: Head

Sources: Electrical, Impact, Heat, Chemical

Required Protection: Where falling object hazards are present, protective helmets complying with ANSI Z89.1-1986 are required. Class A helmets will be used to provide electrical protection up to 2200 volts, Class B up to 20,000 volts. Heat, cold and chemical hazards may require other forms of protection----see supervisor or EH&S.

No stickers or other material that could cover a defect in the helmet is permitted.

Type of Hazard: Eye/Face

Sources: Chemicals, Dusts, Heat, Impact, Light Radiation

Required Protection: Eye protection shall be appropriate for the hazards present and shall meet the requirements of ANSI Z87.1-1989 as indicated by a stamp on the lens and frame. Eye protection must have side shields if there is a risk from flying objects. Affected employees who wear prescription lenses shall wear eye protection that incorporates the prescription in its design, or shall wear eye protection that fits over the prescription lenses.

The following chart taken from 29 CFR 1910 Subpart I Appendix-B provides general guidance for the proper selection of eye and face protection to protect against hazards associated with the listed hazard "source" operations.

Eye and Face Protection Selection Chart

Source	Assessment of Hazard	Protection
IMPACT - Chipping, grinding machining, masonry work, woodworking, sawing, drilling, chiseling, powered fastening, riveting, and sanding.	Flying fragments, objects, large chips, particles sand, dirt, etc. ..	Spectacles with side protection, goggles, face shields. See notes (1), (3), (5), (6), (10). For severe exposure, use faceshield.
HEAT-Furnace operations, pouring, casting, hot dipping, and welding.	Hot sparks	Faceshields, goggles, spectacles with side protection. For severe exposure use faceshield. See notes (1), (2), (3).
	Splash from molten metals.....	Faceshields worn over goggles. See notes (1), (2), (3).
	High temperature exposure.....	Screen face shields, reflective face shields. See notes (1), (2), (3).
CHEMICALS-Acid and chemicals handling, degreasing plating.	Splash	Goggles, eyecup and cover types. For severe exposure, use face shield. See notes (3), (11).
	Irritating mists ..	Special-purpose goggles.
DUST - Woodworking, buffing, general dusty conditions.	Nuisance dust	Goggles, eyecup and cover types. See note (8).
LIGHT and/or RADIATION -	Optical radiation .	Welding helmets or

Welding: Electric arc		welding shields. Typical shades: 10-14. See notes (9), (12).
Welding: Gas	Optical radiation .	Welding goggles or welding face shield. Typical shades: gas welding 4-8, cutting 3-6, brazing 3-4. See note (9).
Cutting, Torch brazing, Torch soldering	Optical radiation ..	Spectacles or welding face-shield. Typical shades, 1.5-3. See notes (3), (9).
Glare	Poor vision	Spectacles with shaded or special-purpose lenses, as suitable. See notes (9), (10).

Notes to Eye and Face Protection Selection Chart:

(1) Care should be taken to recognize the possibility of multiple and simultaneous exposure to a variety of hazards. Adequate protection against the highest level of each of the hazards should be provided. Protective devices do not provide unlimited protection.

(2) Operations involving heat may also involve light radiation. As required by the standard, protection from both hazards must be provided.

(3) Faceshields should only be worn over primary eye protection (spectacles or goggles).

(4) As required by the standard, filter lenses must meet the requirements for shade designations in 1910.133(a)(5). Tinted and shaded lenses are not filter lenses unless they are marked or identified as such.

(5) As required by the standard, persons whose vision requires the use of prescription (Rx) lenses must wear either protective devices fitted with prescription (Rx) lenses or protective devices designed to be worn over regular prescription (Rx) eyewear.

(6) Wearers of contact lenses must also wear appropriate eye and face protection devices in a hazardous environment. It should be recognized that dusty and/or chemical environments may represent an additional hazard to contact lens wearers.

(7) Caution should be exercised in the use of metal frame protective devices in electrical hazard areas.

(8) Atmospheric conditions and the restricted ventilation of the protector can cause lenses to fog. Frequent cleansing may be necessary.

(9) Welding helmets or faceshields should be used only over primary eye protection (spectacles or goggles).

(10) Non-sideshield spectacles are available for frontal protection only, but are not acceptable eye protection for the sources and operations listed for "impact."

(11) Ventilation should be adequate, but well protected from splash entry. Eye and face protection should be designed and used so that it provides both adequate ventilation and protects the wearer from splash entry.

(12) Protection from light radiation is directly related to filter lens density. See note (4). Select the darkest shade that allows task performance.

Each affected employee will use equipment with filter lenses that have a shade number appropriate for the work being performed for protection from injurious light radiation. The following chart taken from 29 CFR 1910.133 is a listing of appropriate shade numbers for various operations.

Filter Lenses for Protection Against Radiant Energy

Operations	Electrode Size 1/32 in.	Arc Current	Minimum(*) Protective Shade
Shielded metal arc welding	Less than 3	Less than 60 ...	7
	3-5	60-160	8
	5-8	160-250	10
	More than 8	250-550	11
Gas metal arc welding and flux cored arc welding		less than 60 ...	7
		60-160	10
		160-250	10
		250-500	10
Gas Tungsten arc welding		less than 50 ...	8
		50-150	8
		150-500	10

Air carbon Arc cutting	(Light)	less than 500 ..	10
	(Heavy)	500-1000	11
Plasma arc welding		less than 20 ...	6
		20-100	8
		100-400	10
		400-800	11
Plasma arc cutting	(light)(**)	less than 300 ..	8
	(medium)(**)	300-400	9
	(heavy)(**)	400-800	10
Torch brazing		.....	3
Torch soldering		.....	2
Carbon arc welding		.....	14

Filter Lenses for Protection Against Radiant Energy

Operations	Plate thickness-inches	Plate thickness-mm	Minimum(*) Protective Shade
Gas Welding:			
Light	Under 1/8	Under 3.2	4
Medium	1/8 to 1/2	3.2 to 12.7	5
Heavy	Over 1/2	Over 12.7	6
Oxygen cutting:			
Light	Under 1	Under 25	3
Medium	1 to 6	25 to 150	4
Heavy	Over 6	Over 150	5

Footnote(*) As a rule of thumb, start with a shade that is too dark to see the weld zone. Then go to a lighter shade, which gives sufficient view of the weld zone without going below the minimum. In oxyfuel gas welding or cutting where the torch produces a high yellow light, it is desirable to use a filter lens that absorbs the yellow or sodium line in the visible light of the (spectrum) operation.

Footnote(**) These values apply where the actual arc is clearly seen. Experience has shown that lighter filters may be used when the arc is hidden by the workpiece.

Type of Hazard: Foot/Leg/Torso

Sources: Falling/Rolling objects, penetration, sharp objects, heat/sparks, electrical and chemical hazards, severe cuts and abrasions.

Required Protection: Protective footwear which meets the requirements of ANSI Z41-1991 provides both impact and compression protection. Where necessary, safety shoes can be obtained which provide puncture protection. Certain situations may require metatarsal (for roll-over), electrical, or chemical protection. Supervisors will work with Environmental Health & Safety Office to determine adequate protection if such hazards arise. Leg protection may need to be in the form of leggings or aprons made of leather or other suitable material when performing welding, high heat operations, severe puncture risk operations, or when there is a quantity exposure to corrosive/toxic chemicals. For a less risky exposure to the above hazards (such as what is commonly encountered in maintenance and chemical lab operations) pants that leave no skin exposed and are made of a durable cloth are required. Torso protection may require vests, jackets, aprons, coveralls, or full body suits. These also must be made of an appropriate material for the task. Refer to the manufacturers guidelines against specific hazards.

Type of Hazard: Hand/Arm

Sources: Severe cuts and abrasions, chemical exposure, punctures, temperature extremes and electrical hazards.

Required Protection: No type of glove provides protection from all hand hazards, and chemical resistant gloves have a limited time before a chemical penetrates. Thus, there may be times when different types of gloves need to be combined or changed frequently. A specific list of the chemical resistivity of different types of gloves is available in the Physical Plant Stockroom, Chemical Stockroom, and the Environmental Health and Safety Office and should be consulted if a suitable type is in question. Also, the type of glove needed should be listed on the products Material Safety Data Sheet. Sleeves for protection against various hazards also need to be considered, with material that provides adequate protection for the task.

Maintenance: All personal protective equipment needs to be properly maintained. Cleaning is particularly important for eye and face protection where dirty or fogged lenses could impair vision. All PPE needs to be maintained at regular intervals and disposed of if decontamination is not possible or its effectiveness is reduced.

Training: Laboratory personnel exposed to chemical hazards are unique in that they determine on a daily basis what chemicals they will work with, how they will work with the hazard and for what duration. Subsequently, they will also determine when and what type of PPE is necessary, the proper way to wear the equipment, and its maintenance and limitations. All other employees will have documented training performed by their supervisors and/or the Environmental Health & Safety Office.

HAZARD ASSESMENT AND PROTECTIVE EQUIPMENT REQUIREMENT FORM

Note: This form is a component of ESF's Personal Protective Equipment plan and should be used in conjunction with the plan's text.

Department: _____ Date: _____

Job Title: _____ Evaluator: _____

Hazards (check):

___Electrical	___Flying Particles	___Heat
___Foot/Leg/Torso Injury	___Hand/Arm Injury	___Noise
___Harmful Dust	___Head Injury	___Roller/Pinching
___Impact	___Light (radiation)	___Puncture
___Chemical Vapor	___Chemical Splash	

Personal Protective Equipment :

___Apron/Smock	___Eye/face Protection	___Respiratory Protection
___Gloves	___Hard hat	___Hearing Protection
___Fall Protection	___Safety Shoes	___Safety Vests
___Protective Clothing		

Notes:

_____

_____

_____

_____

_____

Key for personal protective equipment:

X= as required A= as recommended by applicable MSDS S= see supervisor/EH&S for recommended type

This hazard assessment was performed and the Personal Protective Equipment Plan written by John Wasiel of the Environmental Health & Safety Office in July of 1995. The most recent update is February 2006.

1.

APPENDIX I

Regulated medical wastes defined

Medical wastes covered under New York State and federal regulations:

WASTE CLASS	DESCRIPTION
I) Cultures and stocks	Cultures and stocks of infectious agents and associated biologicals, including: cultures from medical and pathological laboratories; cultures and stocks of infectious agents from research and industrial laboratories; wastes from the production of biologicals; discarded live and attenuated vaccines; and culture dishes and devices used to transfer, inoculate and mix cultures.
2) Pathological wastes	Human pathological wastes, including tissues, organs, body parts and body fluids that are removed during surgery or autopsy, or other medical procedures and specimens of body fluids and their containers.
3) Human blood and blood products	• liquid waste human blood; • products of human blood; • items saturated and/or dripping with human blood, or • items that were saturated and/or dripping with human blood that are now caked with dried human blood, including serum, plasma and other blood components, and their containers, which were used or intended for use in either patient care, testing and laboratory analysis or the development of pharmaceuticals. Intravenous bags are also included in this category.
4) Sharps	Sharps that have been used in animal or human patient care or treatment or in medical, research or industrial laboratories, including hypodermic needles, syringes (with or without the attached needle), Pasteur pipettes, scalpel blades, blood vials, needles with attached tubing and culture dishes (regardless of presence of infectious agents). Also included are other types of broken or unbroken glassware that were in contact with infectious agents, such as used slides and cover slips.
5) Animal waste	Contaminated animal carcasses, body parts and bedding of animals that were known to have been exposed to infectious agents during research (including research in veterinary hospitals), production of biologicals, or testing of pharmaceuticals.
6) Contact wastes	Wastes from surgery or autopsy that were in contact with infectious agents, including soiled dressings, sponges, drapes, lavage tubes, drainage sets, underpads and surgical gloves.
7) Laboratory wastes	Laboratory wastes from medical, pathological, pharmaceutical or other research, commercial, or industrial laboratories that were in contact with infectious agents, including slides and cover slips, disposable gloves, laboratory coats and aprons.
8) Dialysis wastes	Dialysis wastes that were in contact with the blood of patients undergoing hemodialysis or renal dialysis, including contaminated disposable equipment and supplies such as tubing, filters, disposable sheets, towels, gloves, aprons and laboratory coats.
9) Isolation wastes	Biological waste and discarded materials contaminated with blood, excretion, exudates or secretions from humans who are isolated to protect others from certain highly communicable diseases, or isolated animals known to be infected with highly communicable diseases.
10) Unused sharps	The following unused, discarded sharps: hypodermic needles, suture needles, syringes, and scalpel blades.

SUNY College of Environmental Science and Forestry

RECOMBINANT DNA RESEARCH REGISTRATION

IBC Reg. # _____
Date _____
Biosafety Level _____
Action _____

Do Not Write in this Box (IBC Only)

If your research involves any of the following, you are exempt from submitting this IBC form and from NIH Guidelines pertaining to recombinant DNA.

(1) Recombinant DNA in Tissue Culture

Recombinant DNA molecules containing less than one-half of any eukaryotic viral genome.

(2) *Escherichia coli* K-12 Host-Vector Systems

Experiments which use *Escherichia coli* K-12 host vector systems, with the exception of those experiments listed in Appendix C-11-A, are exempt from the *NIH Guidelines* provided that: (i) the *Escherichia coli* host does not contain conjugation proficient plasmids or generalized transducing phages; or (ii) lambda or lambdoid or Ff bacteriophages or non-conjugative plasmids (see Appendix C-VII-B, *Footnotes and References of Appendix C*), shall be used as vectors. However, experiments involving the insertion into *E. coli* K-12 of DNA from prokaryotes that exchange genetic information (see Appendix C-VII-C, *Footnotes and References of Appendix C)* with *E. coli* may be performed with any *E. coli* K-12 vector (e.g., conjugative plasmid). When a non-conjugative vector is used, the *E. coli* K-12 host may contain conjugation-proficient plasmids either autonomous or integrated, or generalized transducing phages. For these exempt laboratory experiments, Biosafety Level (BL) 1 physical containment conditions are recommended. For large-scale fermentation experiments, the appropriate physical containment conditions need be no greater than those for the host organism unmodified by recombinant DNA techniques; the Institutional Biosafety Committee can specify higher containment if deemed necessary.

(3) *Saccharomyces* Host-Vector Systems

Experiments involving *Saccharomyces cerevisiae* and *Saccharomyces uvarum* host-vector systems, with the exception of experiments listed in Appendix C-III-A, are exempt from the *NIH Guidelines*. For these exempt experiments, BL 1 physical containment is recommended. For large-scale fermentation experiments, the appropriate physical containment conditions need be no greater than those for the host organism unmodified by recombinant DNA techniques; the Institutional Biosafety Committee can specify higher containment if deemed necessary.

(4) *Bacillus subtilis* or *Bacillus licheniformis* Host-Vector Systems

Any asporogenic *Bacillus subtillis* or asporogenic *Bacillus licheniformis* strain that does not revert to a spore-former with a frequency greater than 10^{-7} may be used for cloning DNA with the exception of those experiments listed in Appendix C-IV-A, *Exceptions*. For these exempt laboratory experiments, BL-1 physical containment conditions are recommended. For large-scale fermentation experiments, the appropriate physical containment conditions need be no greater than those for the host organism unmodified by recombinant DNA techniques; the Institutional Biosafety Committee can specify higher containment if it deems necessary.

(5) Extrachromosomal Elements of Gram Positive Organisms

Recombinant DNA molecules derived entirely from extrachromosomal elements of the organisms belonging to the following bacterial genera: *Bacillus, Clostridium, Lactobacillus, Listeria, Pediococcus, Staphylococcus,* and *Streptococcus,* with species names provided in *NIH Guidelines* (April 2002).

( ) New Research (Date of Initiation): _____

( ) Ongoing Research Revision

1. Principal Investigator _____

   Title _____

2. Department/Faculty _____

3. Office Number/Building _____

4. Phone Numbers _____

5. Lab Location _____

6. Project Title _____

   _____

7. Granting Agency (if applicable) _____

8. Provide a Project Summary (1 page maximum) _____

9. Sources of DNAs _____

_____

_____

10. If a eukaryotic virus, is it more than 2/3 of the viral genome? _____

11. Will this research include genetic modification of any human or exotic animal or plant pathogen? If yes, describe the risk group level (*NIH Guidelines, Appendix B*) and the genetic modifications to the pathogenic agent and the containment level to be used.

_____

_____

12. Specify the nature (e.g., genomic, cDNA, synthetic, coding or non-coding sequence(s) of the inserted DNA _____

_____

13. Host(s) and vectors to be used _____

   _____

14. Will the experiments involve transgenic, whole animals, whole plants, or greater than 10L of cell culture? If so, explain

15. Will a foreign gene be expressed in the host? _____

If yes, specify the protein(s), materials, toxins, antigens, etc. (include incidental genes of vector _____

16. Physical containment level to be used (Biosafety Levels, BL1, BL2, BL3 or BL4; refer to Federal Guidelines) _____

17. Do you plan to release recombinants (cells or DNAs or whole organisms) into the environment? _____

If so, additional notification or approval is required from the federal government (USDA/EPA/NIH).

18. What disposal methods will be used? _____

19. Names of personnel participating in the recombinant DNA work: _____

20. Attach the abstract of your proposal as an appendix to this form.

NAME ROOM/BUILDING PHONE

21. I accept full responsibility for the safe conduct of the recombinant DNA work described above. I will inform all personnel of the hazards associated with the work and the level of containment required to perform this research safely. I will make them aware of the Federal Guidelines associated with the Biosafety Level that is being required to perform the work.

Principal Investigator: _____ _____
Signature Date

RETURN TO: James P. Nakas (IBC Chairperson)
201 Illick Hall
Environmental and Forest Biology
SUNY College of Environmental Science and Forestry

1 Forestry Drive
Syracuse, NY 13210

Phone: (315) 470-6769

IBC Chair: _____ _____
Signature Date

This form is available in PDF format at http://www.esf.edu/ehs/recomdnareg.pdf.

Assessment of the Levels of Physical and Biological Containment

Containment of recombinant DNA molecules generated by the utilization of these procedures and hosts is described in section III-A-1-b of the NIH Guidelines for research involving recombinant DNA (Revised January 29, 1980). Experiments will be conducted under BL2 + HVI conditions.

BL2 physical containment requires the following laboratory procedures (Section II-B-2):

1. Laboratory doors shall be kept closed while experiments are in progress.

2. Work surfaces shall be decontaminated daily, and immediately following spills of organisms containing recombinant DNA molecules.

3. All laboratory wastes shall be steam sterilized (autoclaved) before disposal. Other contaminated materials such as glassware, animal cages, laboratory equipment, and radioactive wastes shall be decontaminated by a means demonstrated to be effective before washing, reuse, or disposal.

4. Mechanical pipetting devices shall be used; pipetting by mouth is prohibited.

5. Eating, drinking, smoking, and storage of food are not permitted in the laboratory area in which recombinant DNA materials are handled.

6. Persons shall wash their hands after handling organisms containing recombinant DNA molecules and when they leave the laboratory.

7. Care shall be exercised to minimize the creation of aerosols. For example, manipulations such as inserting a hot inoculating loop or needle into a culture, flaming an inoculation loop or needle so that it splatters, and forceful ejection of fluids from pipettes or syringes shall be avoided.

8. Contaminated materials that are to be steam sterilized (autoclaved) or decontaminated at a site away from the laboratory shall be placed in a durable leak-proof container, which is closed before removal from the laboratory.

9. Only persons who have been advised of the nature of the research being conducted shall enter the laboratory.

10. The universal biohazard sign shall be posted on all laboratory access doors when experiments requiring P2 containment are in progress. Freezers and refrigerators or other units used to store organisms containing recombinant DNA molecules shall also be posted with the universal biohazard sign.

11. An insect and rodent control program shall be instituted.

12. The use of laboratory gowns, coats, or uniforms is required. Laboratory clothing shall not be worn to the lunchroom or outside of the building in which the laboratory is located.

13. Animals not related to the experiment shall not be permitted in the laboratory.

14. Use of the hypodermic needle and syringe shall be avoided when alternative methods are available.

15. The laboratory shall be kept neat and clean.

16. Experiments of lesser biohazard potential can be carried out concurrently in carefully demarcated areas of the same laboratory.

APPENDIX J

LABORATORY INSPECTION PROGRAM

Purpose

The College's continuing evolution of safety concern, focusing on the health and well being of the community members, has centered on the need for proactive programs to prevent potential injuries. The responsibility for laboratory safety rests with us all, as does the **liability** when it is lacking. The Environmental Health & Safety Office has been given the charge of providing the vehicle for assuring our laboratories are in compliance with the various state and federal safety regulations.

Method

Annual Laboratory Inspection

1. Faculty Chair/Unit Head notified one week prior to inspection.

2. Laboratory Director(s) notified one week prior to inspection.

3. Inspection team -- two members

4. Inspection categories:
   a. Housekeeping
   b. Chemical Storage
   c. Hazard Communication
   d. Personal Protective Equipment
   e. Ventilation
   f. Spill Clean-up
   g. Waste Management
   h. Emergency
   I. Compressed Gas
   j. Mechanical
   k. Electrical
   l. Radiation Safety

5. Inspection procedure

   a. Inspection Team (Laboratory Director(s), Faculty Chair/Unit Head, or designee may accompany) will inspect all items in the laboratory and indicate compliance or non-compliance, with safety codes, on the Laboratory Inspection Check List.

   b. A copy of the completed Laboratory Inspection Check List shall be given to the Laboratory Director(s) and Faculty Chair/Unit Head.

   c. Any life threatening situations shall be corrected immediately during the inspection.

   d. Any safety or health code violations shall be corrected as soon as possible.

LABORATORY INSPECTION CHECK LIST

Department _____ Date _____

Building _____ Room No. _____ Lab Director(s) _____

Inspection Team _____

	YES	NO	N/A
A. Housekeeping			
1. Walking aisles are clear	_____	_____	_____
2. Broken glass disposal containers provided	_____	_____	_____
3. All items stored appropriately	_____	_____	_____
B. Chemical Storage			
1. Food and chemicals kept separate	_____	_____	_____
2. Chemicals stored in the open are kept to a minimum	_____	_____	_____
3. Glass containers are limited to one gallon size or smaller	_____	_____	_____
4. Flammable liquids in excess of 10 gal are stored in flammable liquid cabinet	_____	_____	_____
5. Acids and bases separated from flammable chemicals and each other	_____	_____	_____
6. Highly toxic chemicals and carcinogens secured	_____	_____	_____
7. Refrigerators used for storage of flammables are properly rated	_____	_____	_____
8. Highly reactive chemicals disposed of prior to expiration date or when no longer needed	_____	_____	_____
9. Chemicals stored in the proper environments/compatible containers	_____	_____	_____
10. Condition of containers is good -- no rust, crud, or ooze	_____	_____	_____
11. Labels clearly indicate contents and associated hazard	_____	_____	_____
C. Personal Protective Equipment			
1. Safety glasses are worn	_____	_____	_____
2. Additional protective equipment is available	_____	_____	_____
3. If noise interferes with normal speech, ear protectors used	_____	_____	_____

Comments: _____

_____

Comments: _____

_____

Comments: _____

_____

	YES	NO	N/A

D. Ventilation

1. Laboratory hoods or other local ventilation present	_____	_____	_____
2. Sash is in working order	_____	_____	_____
3. Equipment is positioned at least eight inches from hood face	_____	_____	_____
4. Gas and electrical shut-offs are outside the hood	_____	_____	_____
5. Hood interior is clean, uncluttered, and free of storage	_____	_____	_____
6. Hazard warning information posted on the sash	_____	_____	_____

Comments: _____

_____

E**. Waste Management**

1. All waste is contained within tightly closed containers	_____	_____	_____
2. Chemical waste labels are present and marked correctly	_____	_____	_____
3. Waste containers monitored for compatibility of chemicals	_____	_____	_____
4. Hallways, maintenance corridors, etc., are free of waste	_____	_____	_____
5. Amount of flammable liquid waste less than five gallons	_____	_____	_____
6. Corrosive liquids stored in non-metal containers	_____	_____	_____
7. Lab occupants are knowledgeable of waste disposal procedures	_____	_____	_____

Comments: _____

_____

F**. Emergency**

1. '"In Case of Emergency" notices current and posted outside door	_____	_____	_____
2. "Let Run Notices" current and posted appropriately	_____	_____	_____
3. All exits are clearly marked and unobstructed	_____	_____	_____
4. "Laboratory Safety Guide" is present	_____	_____	_____
5. Safety shower and eyewash fountain locations clearly marked and Unobstructed	_____	_____	_____

Comments: _____

_____

G. Compressed Gas

1. Manual shut-off valves provided at all points of supply and use	_____	_____	_____
2. Permanent piping systems properly identified	_____	_____	_____
3. Gases with health hazard of two kept in vented enclosures	_____	_____	_____
4. Oxygen and flammable gases stored separately	_____	_____	_____
5. All cylinders are secured	_____	_____	_____
6. "In Use" labels present	_____	_____	_____
7. Gas cylinder, not in use, are capped	_____	_____	_____

Comments: _____

_____

	YES	NO	N/A

H**. Mechanical**

1. Machine guarding, emergency stop, and lock-out controls in place	_____	_____	_____
2. Cutting instruments (razor blades, knives, etc.) sheathed	_____	_____	_____
3. Syringes properly secured and disposed	_____	_____	_____

Comments: _____

_____

I**. Electrical**

1. Electrical equipment double insulated or grounded	_____	_____	_____
2. Cords and plugs in good condition (not pinched/broken/covered)	_____	_____	_____
3. Outlets grounded	_____	_____	_____
4. Wiring appropriate for usage	_____	_____	_____
5. Electrical cords and equipment positioned away from water & heat	_____	_____	_____

Comments: _____

_____

J. **Radiation Safety**

1. All users checked by Radiation Safety Officer	_____	_____	_____
2. “Radioactive Material” signs appropriately posted	_____	_____	_____
3. Pipetting performed correctly	_____	_____	_____
4. Protective clothing used (lab coats, gloves, etc.)	_____	_____	_____
5. Appropriate radioactive waste receptacles used (Liquid/Solid)	_____	_____	_____
6. Personnel wearing “Film Badge”	_____	_____	_____
7. Radionuclide inventory current and available to workers for update	_____	_____	_____

Comments: _____

_____

K**. Exit Interview**

1. All staff and students are aware of procedures in case of:	_____	_____	_____
a. fire	_____	_____	_____
b. chemical spill	_____	_____	_____
c. injury	_____	_____	_____
d. power outage	_____	_____	_____
e. other emergencies	_____	_____	_____
2. All staff and students are aware of locations of MSDS	_____	_____	_____
3. Are special safety procedures/equipment/devices needed in this lab	_____	_____	_____
4. Are explosive materials used in laboratory	_____	_____	_____
5. Are there any utilities in this laboratory that are not working	_____	_____	_____
6. Is there any way the safety personnel can better serve your needs	_____	_____	_____

** If any answer to 4-8 is yes, please explain in comment section **

Comments: _____

_____

APPENDIX K

Hazard Communication Program

This written Hazard Communication Program has been developed to be in compliance with 29CFR 1910.1200(e). Copies of the Hazard Communication Program may be obtained by contacting the Chemical Hygiene Officer

I. General

The purpose of this document is to ensure that the State University of New York College of Environmental Science and Forestry is in compliance with OSHA Hazard Communication Standard (HCS) 29-CFR 1910.1200 (e).

The Occupational Safety and Health Program developed at the SUNY College of Environmental Science and Forestry comes under the review of the Environmental Health & Safety Officer. The senior facility official with overall responsibility is the Vice President for Administration.

II. List of Hazardous Chemicals

A list of hazardous chemicals is maintained by Chemical Hygiene Officer, and updated as needed.

III. Material Safety Data Sheets (MSDS) Information

Material Safety Data Sheets (MSDS) are immediately available to any employee 24 hours a day by one of two means:

1. Hard copies of the MSDS for materials routinely used at the College are available at the Environmental Health and Safety Office during normal working hours.

2. MSDS for thousands of chemicals are available on the Internet. See http://www.ehs.cornell.edu/lrs/internetMSDS.htm.

The Purchasing Department requires that all chemicals received by ESF must have an MSDS prior to acceptance. Researchers and faculty are encouraged to purchase, whenever possible, the least hazardous substance available.

IV. Labels and Other Forms of Warning

Laboratory Directors and the Chemical Hygiene Officer are to ensure that all hazardous chemicals are properly labeled. Labels of chemicals must list the chemical identity and appropriate hazard warning.

V. Training

ESF has established a Comprehensive Chemical Safety Training Program, in three identified levels of instruction, for its employees.

Level 1 - all employees view a video instruction presentation or orientation training which covers hazardous chemical properties, routes of entry, emergency procedures, physical and health hazards associated with exposure, procedures to protect against hazards, personal protective equipment, how to deal with chemical spills and leaks, MSDS locations, and how to obtain and use MSDS information.

A trained instructor leads the group and answers any questions.

Level 2 - covers specific areas such as chemical safety, biological safety, radiation safety for those employees working with specific hazardous substances.

Level 3 - is course or activity specific and is conducted by the class instructors or supervisors.

The Environmental Health & Safety Office maintains records of employee training.

VI. Contractor Employers

The Chemical Hygiene Officer and Facilities Program Coordinator will inform all contractors of any chemical hazard which may be encountered in the normal course of work and will ensure that contractors working with hazardous chemicals provide MSDS's on site. Contractors must perform their work in a manner to prevent ESF personnel from unsafe exposures.

VII. Non-Routine Tasks

Supervisors contemplating a non-routine task must consult with the Chemical Hygiene Officer before assigning work. The Chemical Hygiene Officer is available to answer questions concerning chemical hazards associated with the performance of these tasks and appropriate protective measures to be taken.

VII. Information

Further information on the written Hazard Communication Standards is available in the Environmental Health & Safety Office.

APPENDIX L

SUNY ESF
Chemical Waste Management

The Environmental Health and Safety (EH&S) Office is responsible for properly disposing of chemical waste generated by laboratories and other campus operations. The following information should assist College personnel in accumulating and storing chemical waste in such a manner as to ensure safety and regulatory compliance.

The U.S. Environmental Protection Agency (EPA), the federal and state Departments of Transportation (DOT), and New York State Department of Environmental Conservation (DEC) regulate hazardous waste handling and disposal. Noncompliance with regulatory requirements can result in significant fines and negative publicity. The cooperation of all chemical waste generators is necessary to make ESF a safe place to learn and work. Any questions that are not covered in this document should be directed to the EH&S Office, 5 Bray Hall, x6964.

What Is a Hazardous Waste?

According to the EPA, hazardous waste is any waste that is ignitable (flash point of < 140°F), corrosive (pH of $\leq$ 2 or $\geq$ 12.5), reactive, or specifically listed by the EPA as a toxic waste. Material Safety Data Sheets (MSDS's) are a good source of information for determining whether a particular material meets any of these criteria. Hazardous wastes may include byproducts and wastes from chemical reactions or unwanted commercial products and chemicals.

Hazardous waste determinations are not always straightforward, so if you are unsure whether a particular waste is hazardous or not, contact the EH&S Office for guidance. If you are in doubt, collect the waste and submit it for proper disposal.

Hazardous waste may not be disposed of in the trash or down the drain. It must be collected, submitted to the EH&S Office, and shipped to a permitted treatment, storage, or disposal facility. Improperly managed hazardous waste can present a safety hazard to laboratory and custodial workers, a physical hazard to plumbing and buildings, and an environmental hazard should releases occur to the air, ground, or water.

Hazardous Waste Accumulation and Storage

The following guidelines for accumulating and storing hazardous waste should always be followed:

1. Hazardous waste should be stored near the point of generation, in the lab in which it is generated. Waste should be consolidated in one place in the lab – not spread out in several different cabinets and counter tops. You may utilize a single hazardous waste accumulation area for a suite of labs, as long as the labs are under the control of the same director and all lab occupants are familiar with the activities/experiments of the others. Hazardous waste should not be moved through hallways or to other floors.

2. All waste must be collected in tightly closing, leak-proof containers that must be kept closed except when adding waste. Therefore, stoppered glassware or beakers are not appropriate waste collection containers. Waste collection containers may not be left open with funnels.

3. Ensure the waste material is compatible with the collection container and will not react with it, for example, do not put corrosives in metal containers. In general, plastic containers are preferred to glass, as they are less likely to break if knocked over. If a particular waste is generated on a fairly large scale, as with some solvents, you may want to obtain a 2½-gallon plastic container from the EH&S Office for collection. Smaller containers are also usually available from either the EH&S Office or the Chemical Stockroom.

4. Only similar wastes should be collected in the same container. Mixing incompatible or different types of wastes may cause a chemical reaction or greatly increase disposal costs. Therefore, you may have several different waste containers accumulating at the same time, for example, one for non-chlorinated flammable solvents, another for acids, etc.

5. **Hazardous waste containers must be labeled with the words "Hazardous Waste" in addition to their specific chemical contents.** Hazardous Waste labels are available through the EH&S Office and the A&TS Stockroom. Be sure to list the specific contents on the label, for example, flammable solvents – acetone, hexane. Chemical names must be completely spelled out, abbreviations or chemical structures are not allowed. If you use an empty commercial chemical container to collect waste, you must obliterate the old chemical label to avoid possible confusion as to the contents.

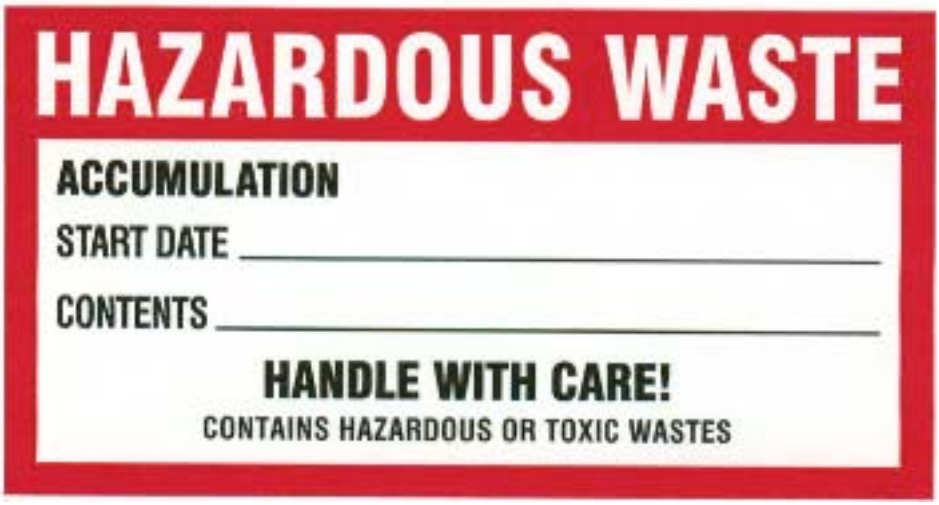
6. Waste containers, as with any chemical container, should not be stored in a location where a spill could potentially cause a release to the environment. Containers should not be stored next to sinks, and ideally not in hoods with sinks. Containers should not be stored on the floor where they can be kicked over, particularly in rooms with floor drains.

Removal of Chemical Waste

When you have waste containers that are full or that you are finished working with, contact the EH&S Office to arrange for the material to be picked up. Complete a *Surplus Chemical/Waste Disposal Form*, being sure to indicate the composition of the waste and quantity and size of containers. The forms are available at the A&TS Stockroom and the EH&S Office. When listing waste components, also include approximate percentages; for example, methylene chloride 50%, water 50%. Send the top white copy of the form to the EH&S Office, 5 Bray Hall, and attach the bottom copy to the waste container. Alternately, if you have a large number of different wastes, you may submit a list that includes all the pertinent information from the *Surplus Chemical/Waste Disposal Form.*

Make sure all containers are in good condition for transport and clearly labeled. Wipe off any spilled material and close the top tightly. Assuming there are no questions regarding the waste, someone from the EH&S Office will then remove the waste from your lab.

If you have unused chemicals that you wish to dispose, make an effort to find someone who may be able to use them, prior to submitting them for disposal. This can save another lab the cost of purchasing the chemical, as well as saving the college the cost of its disposal. However, if the chemical is no longer usable, or you are unable to find a new user, submit it to the EH&S Office for proper disposal.



This label is available from the Environmental Health & Safety Office or the Chemical Supply Stockroom.

Other Types of Waste

Laboratories are generally responsible for disposal of their own non-hazardous wastes, but the EH&S Office is available to assist with determination of a proper disposal method. Additionally, the EH&S Office will remove the following non-hazardous wastes from laboratories. These materials should **not** be labeled "Hazardous Waste".

- Sharps – including hypodermic syringes and needles. These items are considered regulated medical waste and should be stored in a rigid plastic, leak-proof, puncture-resistant container, clearly marked "Sharps". The container must also be marked with the word "Biohazard" or a universal warning sign label.
- Pump oil – This is not a hazardous waste, but it is regulated by New York State. Collect oil in an appropriate waste container, labeled "Used Pump Oil". Be careful not to mix oil with hazardous wastes.

Radioactive Waste

The Federal Nuclear Regulatory Commission and the New York State Department of Health strictly regulate radioactive waste handling. Contact the **Radiation Safety Officer (x6848)** for proper collection and disposal procedures.

Laboratory Chemical Inventories and Housekeeping

For safety reasons, it is best to keep the number of chemicals on-hand in the laboratory limited to those actually in use or planned for use. Periodic reviews of chemical inventories are encouraged to eliminate unwanted chemicals. This is also a good opportunity to ensure all containers are in good condition and clearly labeled. Over time, labels can fade or fall off, leaving an unidentified chemical.

It is also a good policy to ensure students and researchers properly dispose of any wastes or residuals from their work prior to leaving ESF. Otherwise, unidentified chemical containers can be left for future lab occupants to deal with. If the contents could not be identified, the cost of disposal would greatly increase, and accidents could result from improper handling.

SUNY COLLEGE OF ENVIRONMENTAL SCIENCE & FORESTRY

SURPLUS CHEMICAL FORM

Name:_____ Phone:_____

Dept:_____ Bldg:_____ Room::_____

--->Fill Out Completely

II. Waste Description [List components and amounts]

Name: [Add formula if known] % or PPM

1._____

2._____

3._____

4._____

5._____

Quantity [include units]:

Container [circle] Bottle Can Other:_____

Physical State [circle] Solid Liqiuid Sludge Other:_____

----->Give specific chemical names of all materials added to the container (names such as: org material, mixed acids, mixed bases unknown are insufficient).

III. Hazardous Properties [check all that apply]

_____None _____Carcinogen Water-reactive

_____Flammable _____Oxidizer _____Air-reactive

_____Toxic _____Irritant _____Highly volatile

_____Explosive _____Corrosive _____Other

IV. Is this materiall radioactive?_____

- Radioactives are disposed of separately by the Radiation Safety Officer.
- Attach Radioactive Identification and notify RSO immediately!

V. Generator Certification: The undersigned hereby certifies that the above named materials are properly package, labeled, and classified, and are in proper condition for transportation.

Signed:_____ Date:_____

Title:_____

_____

Date Picked Up:_____ Disposal Method:_____

Comments:_____

_____

Date Disposed Of:_____ ESF Official:_____

Once completed, submit white copy to the Environmental Health & Safety Office. The generator can retain the yellow copy, and the card is to be attached to the container. Original forms can be obtained from the Environmental Health & Safety Office X6964.