



Waste Management Log Book

Web address: www.ehs.psu.edu

Designated Accumulation Area:

Building & Room Number

Location in Room

Supervisor:

E-mail

Individual Assigned

to Oversight:

E-mail

Chemical Storage and Waste Management

The following protocols have been established to ensure that all areas comply with Federal- and state-mandated requirements for accumulation of chemical waste. Specifically, chemical waste must be contained in designated accumulation areas using secondary containment, and waste must be labeled and disposed of regularly. Weekly and periodic reviews of chemical storage and waste management must be conducted in each accumulation area, and all persons who handle chemical waste must be trained in safety procedures for chemical storage and waste management. Chemicals inventories must be reviewed annually.

Records must be maintained in each chemical storage or waste accumulation location to document that individuals have been trained and that weekly and annual reviews are being conducted. Please use the forms below to maintain documentation.

Form 1. Waste Management Log Book

Designated Accumulation Area

- building and room number where waste will be accumulated
- specific room location where waste containers will be maintained (i.e. “corner lab bench” or “SE corner of garage”)

Supervisor and E-mail

- name and e-mail address of person responsible for the area

Individual Assigned to Oversight

- name and e-mail address of person assigned to oversee chemical storage and waste management

Form 2. Chemical Storage and Waste Management Acknowledgement of Worker Instructions

Every individual who will handle or supervise individuals handling hazardous chemical waste must receive training in the safety procedures for chemical storage and waste management listed on Form 2. Each individual will sign this form when he/she has completed training; the original will be maintained by the department, and a copy of each signed form should be included in the log book.

Spill Response Procedure: Do not try to clean up any spill that you feel is beyond your training level or abilities. Call Environmental Health and Safety (865-6391) and contact your building safety officer.

For large spills and emergencies, call 911.

Form 3. Individuals Trained to Handle Chemical Waste

This form should list all individuals trained to handle waste in your area. Copies of Form 3 should be sent to the department and to Environmental Health and Safety (EHS). A copy of Form 2 (Acknowledgement of Worker Instructions) for each person on this list should be kept in the log book. Add new names and e-mail addresses as additional individuals are trained.

Form 4. Waste Accumulation Area Chemical Waste Review Log

A chemical waste review must be conducted weekly. Each week, the individual assigned to oversight must conduct a review and document the following information on the review log:

Date Checked: date the review is conducted

Labeled Properly: make sure that each chemical waste container is labeled with a red tag supplied by EHS and that the information on the label is correct. Original labels, if not consistent with waste content, must also be removed or defaced.

Segregated Properly: make sure that chemical waste is segregated according to hazard: flammables separate from bases separate from acids.

Not Leaking: make sure that chemical units are placed in secondary container, are capped and are not leaking

Secondary Containment in Place: make sure that waste is placed in designated and labeled plastic pans (supplied by EHS)

55 Gallon Storage Limit Not Exceeded: make sure that less than 55 gallons of waste are being stored.

Signature of waste Overseer: after the review is conducted and any problems are corrected, the overseer should sign the log.

Form 5. Annual Review of Chemicals

All chemicals stored must be reviewed annually to assure they are not exceeding their expiration dates or safe storage. This log documents whether the chemical was retained or disposed of based on this review. Reasons for retaining the chemical past the expiration date should be noted on the log. The log should be signed and dated when the annual review is conducted.

All chemicals purchased and maintained should be dated when opened. In order to simplify the annual reviews, new chemicals should be added to this list when purchased.

Form 6. Chemical Waste Disposal Manifest Form

Use this form to request removal of chemical waste. Information on how to properly fill out the form will be provided at the training session.

This form should be completed and submitted via the Environmental Health and Safety (EHS) web site:
www.ehs.psu.edu

Fill out the form, print two copies, and submit the form to EHS electronically via their web site. Retain one printed copy in the log book, and put one copy with the chemicals to be picked up.

Form 7. SY 20 Hazardous Waste Disposal Policy

This is the University Policy for Hazardous Waste Disposal. A copy should be retained in this log book.

Labels

Red labels are provided by EHS and must be used to identify hazardous waste.

Secondary Containment in Plastic Pans

Standard containment pans supplied by EHS are to be used for secondary containment for chemical waste.

Waste Management Log Book

A Waste Management Log Book should be maintained in each chemical storage or waste accumulation area.

Environmental Health and Safety Information

This information includes additional safety information as well as links to PSU Safety Policies, chemicals storage guidelines and glove selection information.

Emergency and Safety Phone Numbers

This form should be completed for each area and located on the wall inside the room entrance. Update the form when contact information changes.

Information Form

This form should be completed and located on the room door . Update the form when contact information changes.

Form 8. Annual Review of Chemicals

This form should be completed annually to ensure that all requirements for chemical/ waste management are being met. A copy should be kept in the Waste Management Log Book and in your departmental office central file location.

Form 9. Satellite Accumulation Area Label

This form should be posted in the area where chemical waste is accumulated.

Chemical Storage and Waste Management

Acknowledgement of Worker Instructions

I hereby acknowledge having received instructions on the safety procedures for chemical storage and waste management, including:

- log book documentation
- proper labeling
- proper segregation
- non-leaking chemicals
- chemical containers kept closed when not in use
- storage limits
- chemical review
- safety
- self audit
- secondary containment
- waste disposal procedure (SY 20)
- spill/emergency response procedures
- use/selection of PPE (Personal Protective Equipment)

Specific training topics:

- Plan to designate specific location of waste accumulation
- Ensure documentation is maintained; check labeling, non-leaking chemicals, storage, and containment limits weekly
- How to obtain chemical manifest form and proper procedure for disposal of chemicals
- Segregation of chemicals into categories: flammable, bases, and acids in separate storage pans
- Chemicals are labeled and closed when not in use
- Storage limit (55 gallons) not exceeded
- Spill/ emergency response procedures
- Use/selection of PPE (Personal Protective Equipment)
- Review chemicals annually: document date reviewed, whether chemical is retained or disposed of, and explanation
- Self-audit established by your research group.

Name of Employee Trained (print) Signature of Trained Employee

Date of Training

Name of Trainer

Chemical Waste Accumulation Area: Weekly Review Log

Date Checked	Not Currently Generating Waste	Labeled Properly	Segregated Properly	Not Leaking	Secondary Containment in Place	55 Gal Storage Limit Not Exceeded	Signature of Overseer

Annual Review of Chemicals

Procedure: All chemicals stored will be reviewed annually. Any retained chemicals must be non-leaking, labeled and reviewed. This log documents that the chemical(s) was/were retained or disposed of based on this review. Note the reasons for retaining any chemicals past the expiration date.

Item	Date Reviewed	Retained (R) or Disposed (D)		Explanation for Retention
		R	D	

Form 5

1/05

Name of reviewer _____
Print Signature

Date of Review _____

CHEMICAL/WASTE MANAGEMENT ANNUAL SELF AUDIT

Date of Audit

____ Designated Chemical Accumulation area with room and bldg. listed in log book

____ Names of accumulation area overseer and principle investigator/Supervisor recorded in log book

____ Chemical accumulation review log readily available

____ updated weekly with signature

____ chemicals labeled

____ chemicals in secondary containment

____ chemicals segregated

____ chemicals not leaking

____ total vol. does not exceed 55 gal.

____ Chemical review SOP available and review (chemical inventory) completed annually

____ All persons handling chemicals trained within 90 days of hire.

____ Training records available in work area.

____ Training records sent to Department/Unit Head.

____ Copy of Self audit sent to Department/Unit Head

Name of Principal Investigator/ Supervisor (print)

Signature of Principal Investigator/ Supervisor

Name of Department/Unit Head (print)

Signature of Department/Unit Head

SATELLITE ACCUMULATION AREA

Please Post

Do you know your responsibilities for proper handling of hazardous waste?

Please review the following requirements to ensure that you comply with environmental regulations and safe handling procedures.

TRAINING: Environmental regulations require training of people who generate or handle hazardous waste. Training must take place within 90 days of date-of-hire; and annually thereafter.

Training is offered on a regular schedule by Environmental Health and Safety (EHS). Check EHS Homepage: www.ehs.psu.edu for available dates and times.

CONTAINER LABELING: All hazardous waste containers must have a red waste tag at the time waste is first placed into the container. The red Chemical Disposal Label must accurately identify the content of the container.

EHS supplies secondary containers and red tags. Call EHS if you need supplies or additional instructions.

CONTAINER CLOSURE: Hazardous waste containers must be closed at all times during storage, except when waste is being added or removed.

Keep containers closed. Regulations do not permit open funnels in waste containers.

STORAGE: For safety and environmental reasons, hazardous waste must be stored in a designated "Satellite Accumulation Area". These areas must be inspected weekly for container leakage, labeling, chemical compatibility and to determine that total volume does not exceed 55 gallons.

If you have full waste containers, please fill out a Chemical Manifest form available on our web page, www.ehs.psu.edu.

Environmental Health and Safety Information

Important Links

Policies:

Policy SY01 ENVIRONMENTAL HEALTH AND SAFETY POLICY

<http://guru.psu.edu/policies/SY01.html>

Policy SY20 HAZARDOUS WASTE DISPOSAL

<http://guru.psu.edu/policies/SY20.html>

Policy SY25 COMPRESSED GAS CYLINDERS

<http://guru.psu.edu/policies/SY25.html>

Policy SY08 STORAGE, DISPENSING AND USE OF FLAMMABLE LIQUIDS ON UNIVERSITY PROPERTY

<http://guru.psu.edu/policies/SY08.html>

Policy SY11 REFRIGERATORS - EXPLOSION-PROOF

<http://guru.psu.edu/policies/SY11.html>

Policy SY21 FIRST AID KITS

<http://guru.psu.edu/policies/SY21.html>

Laboratory Safety Self-Inspection Form

http://www.ehs.psu.edu/occhealth/laboratory_self_audit_form_06.pdf

Selected glove manufacturers with glove type and protective key:

http://www.stanford.edu/dept/EHS/prod/researchlab/lab/glove/glove_table.html

The following combinations are potentially

FATAL

1. Ethyl Alcohol + HCL ($\geq 5\%$): Explosive
2. Methanol + Sulfuric Acid: Severly Toxic
3. Phosphoric Acid + Any Alcohol: Nerve Poisons
4. Hydrogen Peroxide + Acid: Violent Reaction
5. Chromic Acid + any Alcohol, Acetone, Plastic, or other organic: Explosive
6. Perchloric acid + Any alcohol, Acetone, Plastic, or other organic: Very Explosive
7. Cyanide Compounds + Any Acid: Deadly Gas

Other things to watch out for:

1. Perchloric Acid: extremely explosive when dry, it requires special hoods. Perchloric-rated hoods will say so on them.
2. Picric Acid: also explosive when dry. Generally not used any more.
3. Fine Metal Powders: Explosive on exposure to air.
4. Hydrofluoric acid (HF): requires special plastic containers, since it eats through glass. If HF contacts skin, it will burn the nerve endings faster than the flesh, with the result that you won't feel anything as your skin is quickly eaten away. Even if you immediately flush your skin with a lot of water, the residual HF will continue to burn through your skin slowly for months. Very, very ugly.
5. Methanol and Acetone: for routine sample rinsing, etc., substitute ethanol for methanol or acetone. Methanol and acetone are somewhat toxic and can be absorbed through the skin in sufficient quantities to cause liver damage.

If you have a question:

EH&S has Material Safety Data Sheets for each chemical which explain the hazards associated with handling, storing, and using the chemical. Also, the EH&S personnel can answer many questions, 865-6391.

35 REASONS WHY WE ENCOURAGE OU NOT TO STORE CHEMICALS IN ALPHABETICAL ORDER

1.	Acetic acid – acetaldehyde	Small amounts of acetic acid will cause the acetaldehyde to polymerize thus releasing great amounts of heat
2.	Acetic Anhydride – Acetaldehyde	Reaction can be violently explosive
3.	Aluminum metal – ammonium nitrate	Reaction can be violently explosive
4.	Aluminum metal powder – antimony trichloride	Aluminum metal burns in the presence of antimony
5.	Aluminum metal – any bromate, chlorate or iodate	Finely divided aluminum plus any finely divided bromate produces a potential explosive easily detonated by heat, percussion or friction
6.	Aluminum – bromine vapor	Aluminum foil reacts with bromine vapor at room temperature and incandescens
7.	Aluminum chloride SELF REACTING	After long storage in closed containers explosions have been known to occur when the container is opened
8.	Ammonia vapor – bromine vapor	Unusable nitrogen tribromide is formed and explosion may result
9.	Ammonium nitrate – acetic acid	A mixture may result in ignition especially if the acetic acid is concentrated
10.	Antimony – bromine vapor or any halogen vapor	Antimony is spontaneously flammable in the presence of any halogen vapor
11.	Arsenic – any bromate, chlorate or iodate	A potential explosive combination detonated by heat, percussion or friction
12.	Barium – carbon tetrachloride	A violent reaction may occur
13.	Calcium hypochlorite – charcoal	An equal mixture can result in an explosion if heated
14.	Carbon – any bromate, chlorate or iodate	A potential explosive combination detonated by heat, percussion or friction
15.	Carbon disulfide vapor – powdered aluminum	Finely divided aluminum will spontaneously burst into flame in the presence of carbon disulfide
16.	Copper – bromate, chlorate or iodate	A potential explosive combination detonated by heat, percussion or friction
17.	Cupric sulfide – cadmium chlorate	Will explode on contact
18.	Hydrogen peroxide – ferrous sulfide	A vigorous, highly exothermic reaction
19.	Hydrogen peroxide – lead II or IV oxide	Violent, possible explosive reaction
20.	Lead perchlorate – methyl alcohol	An explosive mixture if agitated
21.	Lead sulfide – hydrogen peroxide	Vigorous, potentially explosive reactions
22.	Magnesium hydroxide – maleic anhydride	Potentially explosive reaction
23.	Maleic anhydride – lithium metal	Maleic anhydride decomposes explosively in the presence of alkali metals
24.	Mercury II nitrate – methyl alcohol	May form mercury fulminate – an explosive
25.	Mercury II oxide – magnesium metal powder	Will react with explosive force
26.	Mercury II oxide – phosphorous	Percussion may ignite this mixture
27.	Nitric acid – magnesium metal powder	Will react with explosive force
28.	Nitric acid – phosphorous	Phosphorus will burn spontaneously in the presence of nitric acid
29.	Potassium cyanide – potassium nitrate	A potentially explosive mixture if heated
30.	Potassium metal – potassium peroxide	The peroxide can oxidize the metal to incandescence
31.	Silver metal – tartaric acid	An explosive mixture
32.	Silver oxide – sulfur	A potentially explosive mixture
33.	Sodium – sulfur	Under the right conditions the reaction can proceed with explosive violence
34.	Sodium nitrate – sodium thiosulfate	A mixture of dry materials can result in explosion
35.	Stannic chloride – turpentine	A flame producing, exothermic reaction



Guidelines for Working with Hydrofluoric Acid

Exposure to hydrofluoric acid can cause damage with delayed symptoms that can result in serious deep tissue injury. Its use to dissolve silicate is widespread across the University. Damage can occur through all routes of exposure, which are: 1) skin contact, 2) inhalation, 3) accidental ingestion.

- **Skin contact** Skin exposure covering an area as little as 25 cm² can be fatal. Use protective clothing such as splash goggles, lab coat, apron, and gloves of natural rubber, nitrile or neoprene. Wash gloves and hands after each use to remove any residue.
- **Inhalation** Use a chemical fume hood with operations that can produce aerosols or fumes. Special gas cabinets should be used for fluorine gas.
- **Ingestion** Never eat or drink in a laboratory, wash hands prior to eating or drinking.

Other steps to minimize exposure potential are also useful:

- A trial run with a compound other than HF to identify any experimental, procedural or handling shortfalls.
- Never store HF in glass containers, they will be dissolved.
- Use the smallest quantities of HF possible to reduce exposure potential.

If you are exposed or think you have been exposed:

- Rinse affected area with running water until benzalkonium chloride concentrate (17% solution) from the laboratory refrigerator can be applied.
- As quickly as possible, apply 17% benzalkonium chloride soaks (using thoroughly soaked sterile gauze pads) at the site of exposure. Apply additional "iced" 17% benzalkonium chloride (after immersion of the solution container in an ice bath) to the gauze pad every 3 minutes.
- Seek medical attention immediately at University Health Services or Mount Nittany Medical Center.
- For a respiratory exposure, remove individual to fresh air, call 911 and seek medical attention immediately.

As with any chemical that you are using, familiarize yourself with the hazards and safe handling practices by reading the Material Data Safety Sheet. The sheets are available 24 hours a day on the EHS website, www.ehs.psu.edu or by calling the Office of Environmental Health and Safety at 865-6391.