University of South Carolina Aiken
Hazardous Waste (HazWaste) Plan

Purpose: This document is the basic plan from which all University of South Carolina Aiken (USCA) safety training is derived from. This document does not replace federal, state, or local laws, safety rules or requirements.

Scope: This document implements the USCA Chancellor's safety policy. This plan is to serve as the basis for workplace safety plans and campus-wide safety training documents. When there is a conflict between the requirements of this plan and federal, state, or local safety rules the most stringent guidance will be applied providing it meets or exceeds federal, state, and local requirements.

Applicability: This document applies to all full-time, part-time, temporary and student employees on or off-campus while conducting official business on behalf of the University of South Carolina Aiken.

Environmental Health and Safety Office
Phone: (803) 641-3538

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Identifying Hazardous Wastes

Under the under the Resource Conservation and Recovery Act (RCRA) the Environmental Protection Agency (EPA) defines the term "hazardous waste" to mean the following:

- "Hazardous Waste" – is a solid waste, or a combination of solid wastes, which may pose a hazard to human health or the environment because of the physical, chemical, or infectious, characteristics of the waste or because of its quantity or concentration.
- "Solid" – is broadly defined under RCRA and may include any form or waste (solid, semisolid, liquid, or contained gas). Whether the waste is regulated by
- "Waste" – is any discarded material including solid, liquid, semisolid, or contained gaseous material resulting from industrial operations, commercial, mining, agricultural operations, and community activities; however, the definition of "waste" does not include solid or dissolved material in domestic sewage.

RCRA (Resource Conservation and Recovery Act), has more to do with the manner of disposal than the form or appearance of the waste. Generally speaking, if a waste (hazardous or non-hazardous) is recycled OR collected, stored, and disposed of by incineration or disposal to a public landfill, then the waste is regulated by RCRA. The Clean Water Act (CWA) regulates wastes that are poured down the drain, while the Clean Air Act (CAA) regulates wastes that are evaporated or suspended as particulates in air. Garbage, refuse or sludge from a waste treatment plant, or air pollution control facility are considered "wastes" under RCRA.

The U. S. Environmental Protection Agency (EPA) and the State of South Carolina's Department of Health and Environmental Control (DHEC) have classified hazardous wastes into two categories:

- Listed Wastes
- Characteristic Wastes

Listed Wastes

According to the EPA, any waste is "hazardous" if it poses a threat to human health or the environment. To date, the EPA has identified over 500 "solid wastes" as "listed wastes", because they are known to be hazardous. These wastes are listed by technical name in four (4) different lists: "F"- listed waste, "K" –listed waste, "U"-listed waste, and "P" listed waste. "F" and "K" – listed wastes are specific to processes and are not likely to apply to wastes generated on the USCA campus. There are three notable exceptions.

USCA has generated wastes with the following "F" – listed hazardous waste codes:

F001 – Spent Halogenated Solvents Used in Degreasing
Tetrachloroethylene (CAS# 127-18-4, U210)
Trichloroethylene (CAS# 79-01-6, U228)
Methylene chloride (CAS# 75-09-2, U080)

1,1,1-Trichloroethane (CAS# 75-09-2, U226)
Chlorinated Fluorocarbons
F002 – Spent Halogenated Solvents
Tetrachloroethylene (CAS# 127-18-4, U210)
Trichloroethylene (CAS# 79-01-6, U228)
Methylene chloride (CAS# 75-09-2, U080)
1,1,1-Trichloroethane (CAS# 75-09-2, U226)
Chlorobenzene (CAS# 108-90-7, U037)
1,1,2-Trichloro – 1,2,2-trifluoroethane (CAS# 76-13-1)
o-Dichlorobenzene (CAS# 95-50-1, U070)
Trichlorofluoromethane (CAS# 75-69-4, U121)
1,1,2-Trichloroethane (CAS# 79-00-5, U227)
F003 – Spent Non-Halogenated Solvents
Xylene (CAS# 1330-20-7, U239)
Acetone (CAS# 67-64-1, U002)
Ethyl acetate (CAS# 141-78-6, U112)
Methyl isobutyl ketone (CAS# 108-10-1, U161)
n-Butyl alcohol (CAS# 71-36-3, U031)
Cyclohexanone (CAS# 108-94-1, U057)
Methanol (CAS# 67-56-1, U154)

For a copy of the RCRA listed wastes, contact the Environmental Health and Safety Manager. If the waste (or a component of the waste) is not "listed" under RCRA, then it does not mean that the waste is not "hazardous". Any waste classified as a "characteristic waste" under RCRA is a hazardous waste. Radioactive wastes are not regulated under RCRA, but all radioactive wastes are regulated by South Carolina Department of Health and Environmental Control (SCDHEC). Radioactive wastes will be collected for disposal by Radiation Safety a division of USC- Columbia's Environmental Health and Safety Office (EHS). Laboratories and classrooms using radioactive materials or equipment that emit potentially harmful forms of radiation must participate in the USC Radiation Safety Program (for more details contact Radiation Safety on the USC campus in Columbia at 819-5269).

Characteristic Wastes

"Characteristic Waste" – Any "solid waste" is classified as a characteristic waste, if a representative sample of the waste exhibits one or more or the following characteristics:

- Ignitability
- Corrosivity
- Reactivity
- Toxicity

Ignitability

"Ignitability" is defined as characteristic property of any one of the following:

- A liquid (other than aqueous solution containing less than 24% alcohol by volume) with a flash point of less than 140 □F (60□C).
- A substance (other than a liquid) that is capable, under standard temperature and pressure, of causing fire through friction, absorption of moisture, or spontaneous chemical changes, and when ignited, burns vigorously and persistently.
- An ignitable compressed gas as defined in 49 CFR 173.300.
- An oxidizer as defined in 49 CFR 173.151.

D001 – is the RCRA hazardous waste code for wastes exhibiting the characteristic of "ignitability".

Corrosivity

"Corrosivity" – is defined as a characteristic property of any one of the following:

- An aqueous waste with a pH ≤2 and pH ≥12.5.
- A liquid that corrodes steel at a rate greater than 6.35 mm per year at a test temperature of 130*F (55*C).

Corrosivity was established as a hazardous waste characteristic to identify those wastes that might be capable of corroding metal containers and contaminating the environment.

D002 – is the RCRA hazardous waste code for wastes exhibiting the characteristic of "corrosivity".

Reactivity

"Reactivity" – is a characteristic property of a waste described by the following:

- Unstable because it readily undergoes violent change without detonating.
- Detonates or undergoes an explosive reaction when subjected to a strong initiating source (impact) or when heated under confinement.
- Reacts violently with water.
- Forms potentially explosive mixtures with water.
- Generates a toxic gas, vapor, or fume when mixed with water in a quantity that is sufficient to present a danger to human health or the environment.

• A cyanide or sulfide containing waste that under the conditions of pH =2 and pH =12.5 in aqueous solution can generate a toxic gas, vapor, or fume in a quantity sufficient to present a danger to human health or the environment.

D003 – is the RCRA hazardous waste code for wastes exhibiting the characteristic of "reactivity".

List of Common D003 Wastes:

Sulfides
Iron (II) sulfide Barium Sulfide
Iron (III) sulfide Lead Sulfide
Zinc sulfide Calcium Sulfide
Sodium Sulfide
Cadmium Sulfide
Antimony (III) Sulfide

Cyanides
Sodium cyanide
Potassium cyanide
Copper cyanide
Potassium ferrocyanide
Potassium ferricyanide
ANY waste containing cyanide, hexacyanoferrate (II) or hexacyanoferrate (III) reactive wastes.

Others:
Thionyl chloride Sodium (metal)
Toluene sulfonyl chloride Arsenic trioxide
Antimony (III) chloride Arsenic pentoxide
Tantalum pentafluoride Hydrazine
Potassium (metal)

Toxicity

"Toxicity" – describes wastes that are "harmful", or fatal when inhaled, ingested, or absorbed. The following table lists substances that the EPA identifies as having the characteristic property of "toxicity" at or above a specified concentration.

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RCRA Code	Constituent	CAS Number	Hazardous Conc. Mixture (mg/L or ppm)
D004	Arsenic	7440-38-2	5.0
D005	Barium	7440-39-3	100
D018	Benzene	71-43-2	0.5
D006	Cadmium	7440-43-9	1.0
D019	Carbon tetrachloride	56-23-5	0.5
D020	Chlordane	57-74-9	0.03
D021	Chlorobenzene	108-90-7	100
D022	Chloroform	67-66-3	6.0
D007	Chromium	7440-47-3	5.0
D023	o-Cresol	95-48-7	200
D024	m-Cresol	108-39-4	200
D025	p-Cresol	106-44-5	200
D026	Cresol		200
D016	2,4-Dichlorophenoxyacetic acid	94-75-7	10
D027	1,4-Dichlorobenzene	106-46-7	7.5
D028	1,2-Dichloroethane	107-06-2	0.5
D029	1,1-Dichloroethylene	75-35-4	0.7
D030	2,4-Dinitrotoluene	121-14-2	0.13
D012	Endrin	72-20-8	0.02
D031	Heptachlor (and its epoxide)	76-44-8	0.008
D032	Hexachlorobenzene	118-74-1	0.13
D033	Hexachlorobutadiene	87-68-3	0.5
D034	Hexachloroethane	67-72-1	3.0
D008	Lead	7439-92-1	5.0
D013	Lindane	58-89-9	0.4
D009	Mercury	7439-97-6	0.2
D014	Methoxychlor	72-43-5	10.0
D035	Methyl ethyl ketone	78-93-3	200
D036	Nitrobenzene	98-95-3	2.0
D037	Pentachlorophenol	87-86-5	100
D038	Pyridine	110-86-1	5.0
D010	Selenium	7782-49-2	1.0
D011	Silver	7440-22-4	5.0
D039	Tetrachloroethylene	127-18-4	0.7
D015	Toxaphene	8001-35-2	0.5
D040	Trichloroethylene	79-01-6	0.5
D041	2,4,5-Trichlorophenol	95-95-4	400
D042	2,4,6-Trichlorophenol	88-06-2	2.0
D017	2,4,5-TP (Silvex)	93-72-1	1.0
D043	Vinyl chloride	75-01-4	0.2

Hazardous Waste Containers

Collect hazardous wastes for disposal in shatterproof containers (plastic or metal) whenever possible. Make sure that the container material is compatible with or chemically resistant to the waste. Some wastes cannot be stored long term in inexpensive plastic containers. Similarly, the solder on seamed, inexpensive steel pails may not hold-up to some solvents and will consequently begin to leak over-time. Departments are not required to purchase expensive fluorinated plastic containers as waste containers for one-time use and disposal. The department may store wastes that are incompatible with most affordable plastic or metal containers in glass containers provided that the container is always stored in a secondary plastic container that will capture at least 130% of the waste should the container break or leak. Chemical compatibility charts are provided by the manufacturers or suppliers of plastic storage containers.

The department and/or the Hazardous Waste Generator is responsible for having sufficient materials (including PPE) on hand to clean-up spills from broken or leaking hazardous waste containers. Unused chemicals in the original manufacturer's container should remain in the original manufacturer's container provided that the container and container label are in good condition. If the original manufacturer's container label is in good condition and accurately describes the contents, then it is not necessary to complete the all the information on the Hazardous Waste Tag. Simply attach the tag to the container, date the tag, and store the container in a Satellite Accumulation Area (SAA). (Refer to section 3 of this document). Only containers with secure closures will be used to collect or store hazardous wastes. Hazardous waste containers will be closed unless waste is being added to or removed from the container.

Segregate solvent waste into 3 classes:

- Halogenated (e.g., dichloromethane, chloroform)
- Water miscible, non-halogenated (e.g., acetone, ethyl alcohol)
- Non-water miscible, non-halogenated (e.g., hexane, petroleum ether)

Do not mix organic wastes with inorganic wastes. Segregate acids and bases; do not mix acids or bases with solvents. Separate mixtures of immiscible liquid wastes. Place containers of liquid wastes in secondary containers to contain leaks, drips, and spills from the waste container.

Labeling of Hazardous Waste Containers

Label containers with a complete Hazardous Waste Tag. Blank tags are available in the Department of Operations through the Environmental Health and Safety Manager (EHSM).

Instructions for completing the Hazardous Waste Tag:

The front of the Hazardous Waste Tag identifies the container with the associated Hazardous Waste Generator.

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Hazardous Waste Tag Example:

Tag ___ of ___

HAZARDOUS WASTE
Federal and South Carolina law prohibits improper storage or disposal.

If found, contact the Environmental Health and Safety Manager at 803-641-3538, USCA Public Safety at 803-648-4011, or the S.C. Department of Health and Environmental Control.

Container Number: _____

Container (size & type): _____
_____

Location: _____

Generator Name: _____
_____
(Responsible Supervisor, PI, Instructor, or Dept. Chair)

Phone-#: _____

Date Established: _____

For a list /description of the contents refer to the reverse side of this tag.

Container Number

Enter a UNIQUE container number in this blank space. To generate a container number, just add the letter code for your department to any unique numbering system that meets the needs of your department. A department can use any numbering system provided that the container numbers are unique and begin with the department abbreviation. For example, CHM-1 would be the first container to be numbered by the Chemistry Department.

Department	Abbreviation
Chemistry	CHM
Biology/Geology	BIO
Grounds Maintenance	GMT
Housekeeping	HSK
Maintenance	MNT
Visual and Performing Arts	VPA
Ruth Patrick Science Ed. Ctr.	RPSEC
Physics	PHY
Psychology	PSY

All other departments will notify the EHSM for their letter code when they generate waste to determine if it is hazardous and receive a departmental code for proper disposal.

Container Size & Type

Use this line to describe the container size and type of waste container. Some example descriptions are as follows:

- 1-L glass bottle
- 500-mL plastic bottle
- 30-gal. fiber drum
- 1-L plastic jar
- 5 gal. HDPE closed head drum
- 5 gal. closed head steel pail
- 500 ml PE bottle

The minimum description of the "type" of container will simply identify the material of the container. Container materials are typically glass, plastic, metal, or fiber and any one of these terms is sufficient to describe the container "type".

Location

This is simply the building number, name, or abbreviation followed by a semicolon and the room number (if applicable) for the physical location of the hazardous waste container (e.g., 910; 317 or Sciences; 317 or SBDG; 317). When a room number or building number is not applicable this entry may be used to describe the location of the container. Waste containers should only be stored in Satellite Accumulation Areas within a department.

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Generator Name

Print the first and last name of the Supervisor, PI, Instructor or Department Chair who generated the hazardous waste or who has knowledge of the contents of the waste container including the number of hazardous components in the waste.

Phone Number

This is the office phone number of the hazardous waste generator.

Date Established

This is the date (month/year) that the hazardous waste generator first started collecting wastes in the container.

List/Description of the Contents

The back of the Hazardous Waste Tag identifies the components of the waste.

Tag ___ of ___

Total Estimate of Waste in this container
[kg, g, or pounds]: _____

Description:

1) _____
2) _____
3) _____
4) _____
5) _____
6) _____
7) _____

Provide an estimate (kg, g, or pounds) for the total amount of waste in this container. Describe or list all components including debris and water. Provide an estimate of the wt. % for each component. Do not use chemical formulas or abbreviations. Write out the chemical or trade name.

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Total Estimate of Waste

The first entry on the back of the Hazardous Waste Tag is the total estimate in Kilograms (kg), grams (g), or pounds for the waste in the container. All material inside the container is waste (including water, debris, etc.). The mass of the container itself is not part of the estimate for the amount of waste.

Description of Waste

The section titled "Description" can be used to briefly describe the waste in short sentences or phrases. Completion of this section of the tag is not always necessary, but the information printed in this space may be useful. Information about the waste such as phase (e.g., solid, liquid, sludge, compressed gas) or pH for aqueous solutions should be included in this section.

There are spaces provided beneath the "Description" section to list the individual chemical components of the hazardous waste. Beside each number, there is a blank space for identifying a component of the waste to distinguish separate components of the waste. Each component of the waste must be listed by the chemical or trade name. Abbreviations are unacceptable. Chemical formulas are unacceptable even for ions. For example, Chromium (III) is acceptable not Cr3+, and Ethyl Alcohol is acceptable not ETOH. Provide information about the quantity of the component in the waste, after the name for the component. Estimate the quantity as a percent weight or range by percent weight.

For Example:

Tag ___ of ___

Total Estimate of Waste in this container
[kg, g, or pounds}: 1-kg .
Description:
There is broken glass, paper towels and
other debris mixed in with the liquid waste.
1) _Lead nitrate, 0.1-0.2%_____
2) _Chromium (III) nitrate, 0.1-0.2%_____
3) _Silver nitrate, 0.1-0.2%_____
4) _Water □□93% _____
5) _Debris □□5% _____
6) _____
7) _____
8) _____
9) _____
10) _____

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Provide an estimate (kg, g, or pounds) for the total amount of waste in this container. Describe or list all components including debris and water. Provide an estimate of the wt. % for each component. Do not use chemical formulas or abbreviations. Write out the chemical or trade name. At the top of each tag there is an entry for the tag number when multiple tags are required to list all the components of the waste when greater than ten components.

Labeling Responsibilities of the Hazardous Waste Generator

Complete both sides of the Hazardous Waste Tag and attach the tag to the waste container at the time the waste container is established. Whenever additional wastes are added to the waste container the container tag(s) must reflect the addition. Be sure to write the date (month/year) on the tag. Complete the Hazardous Waste Tag(s) by printing or writing legibly. Attach the Hazardous Waste Tag(s) securely to the container, but make sure that the tag(s) can be removed or replaced if necessary.

No container will have the word "waste" written on it unless the container has a completed Hazardous Waste Tag attached to it. Every component of the waste must be identified by chemical or trade name. Abbreviations and chemical formulas are not acceptable. The amount of each component in the waste container will be listed on the label. Rough estimates and broad ranges are acceptable for reporting the composition of the waste. (Even "ball-park" or "order of magnitude" estimates are preferable to providing no information about composition other than the identity of the components).

Satellite Accumulation Point (SAP)

Wastes within departments will be collected and stored in Satellite Accumulation Points designated by the department. The Satellite Accumulation Point must be near the location where the hazardous waste is generated. Satellite Accumulation Points will be under the control of the Hazardous Waste Generator. Satellite Accumulation Points will be clearly identified as such by a sign. No more than 55 gallons of waste will be stored in a Satellite Accumulation Point. Waste Containers in the Satellite Accumulation Point must be in good condition and meet all the requirements for a hazardous waste container.

Hazardous Waste Pickup

Request and Notification for Pickup

Departments will request pickup of hazardous waste six-weeks prior to the desired pickup date with the Environmental Health and Safety Manager. The EHS Manager will then schedule pickup with a waste contractor and notify the requesting department of a firm pickup date no later than four-weeks from scheduled pickup. After being notified by the EHSM, departments will have 2 weeks to complete a Hazardous Waste Inventory Form (See Appendix A for an example) and make sure that all labels on waste containers are complete and attached to the waste containers.

Hazardous Waste Inventory

An inventory of all hazardous waste containers and their contents is required by the Transportation, Storage, and Disposal facility (or TSD facility) that is contracted to collect, treat, and dispose of USCA waste. The contract TSD facility requires a copy of the hazardous waste inventory before the scheduled pickup. Every department with waste must complete a Hazardous Waste Inventory Form and submit it to the EHSM prior to the removal date. An example of the Hazardous Waste Inventory Form is provided in Appendix A. Hazardous Waste Inventory Forms can be found with the Department of Operations.

Department Contact

The Department Administrator is responsible for identifying a Department Contact who will provide the EHSM with a copy of the complete departmental Hazardous Waste Inventory Form and work with the EHSM to coordinate the hazardous waste pick-up for the department. The Departmental Contact will retain a complete copy of the Hazardous Waste Inventory Form for his/her records and send a copy to the EHSM before the scheduled pick-up.

Summary of Roles and Responsibilities

Hazardous Waste Generator

The Hazardous Waste Generator is responsible for understanding the hazards of the chemicals purchased for the laboratory or work area. The Hazardous Waste Generator must ensure that measures are taken to manage the wastes appropriately and in accordance with State and Federal regulations and USCA policy for managing hazardous chemicals and hazardous wastes. The Hazardous Waste Generator will identify, segregate, collect, and label, all hazardous wastes generated in their area. Radioactive, chemical, and biological wastes will not be mixed together. The Hazardous Waste Generator is responsible for contacting the EHSM (ext. – 3538 or by e-mail) with questions about hazardous waste disposal, the identification of hazardous wastes, waste containers, and questions about completing the Hazardous Waste Tag, or the Hazardous Waste Inventory Form. The Hazardous Waste Generator is responsible for notifying the EHSM to request Hazardous Waste Tags. The Department and Hazardous Waste Generator will implement a waste minimization plan through substitution, scale reduction, and purchasing/inventory control.

Department

Departments will print copies of the Hazardous Waste Inventory Form as needed. An example Hazardous Waste Inventory Form is provided in Appendix A of this document. Blank forms can be found with the Department of Operations. Departments will complete and return the Hazardous Waste Inventory Form to the EHSM within the time frame specified by the EHSM after being notified that a hazardous waste pick-up is scheduled. Departments must supply their own containers for hazardous waste disposal.

The waste containers must be closed except when adding waste to or removing waste from the container. Containers of liquid wastes should be placed in secondary containers to contain leaks, drips, and spills. Hazardous waste will remain in a Satellite Accumulation Area (SAA) within the department unless otherwise informed by the EHSM. Departments are responsible for designating SAA(s) in their areas. When requested by the EHSM, waste from Departmental Satellite Accumulation Area(s) will be transferred to an Accumulation Area specified by the EHSM. Departments will inform their employees about the USCA hazardous waste disposal program and about their responsibilities for managing hazardous wastes within their department. The Department Administrator is responsible for identifying a Department Contact who will provide the EHSM with a copy of the complete Hazardous Waste Inventory Form and work with the EHSM to coordinate the hazardous waste pick-up for the Department.

Appendix A

Hazardous Waste Inventory Form

Hazardous Waste Inventory Form
Department/Area:_Chemistry_____
Page _1_ of _1_

Contact:_John Doe_____

Container #	Description	Total Amt. of Waste (Total amt. for each component)	RCRA Code	(EHSM only) Location/ Room #	Generator
CHM-1	Ethanol (5 gallons)	~ 20kg / 100%		317	J. Doe
CHM-2	Mixture of the following	~ 1kg		316	J. Doe
	4-nitrosophenol	<0.1%			
	Methanol	10-15%			
	Phenol	~ 5%			
	Water	70-80%			
CHM-3	Ethyl Acetate	~ 2kg / 100%		317	J. Doe