



Laboratory Management Plan

In Accordance with the Alternative Requirements for Eligible Academic
Laboratories

WAC 173-303-235

40 CFR 262 Subpart K

Updated July 14, 2022

Document Change Record

For

University of Puget Sound Laboratory Management Plan

A change log is used to provide an audit trail of all approved changes made to the documents that make up the course after initial approval and posting. Changes will be reviewed and approved prior to incorporating into the document using established configuration management procedures. Updated revisions of this document will be made as approved changes impact the page numbers or content. This information will also be logged in the change control log. For columns not applicable, enter "N/A". Table 1 is used to register all changes made to the documents that are part of University of Puget Sound Laboratory Management Plan. Published Date Status (Baseline, Revision, Cancelled) Document Version Number Page(s) Affected Description of Revision (Include Document Name and Reason for change)

Table 1 is used to register all changes made to the documents that are part of University of Puget Sound Laboratory Management Plan.

Table 1: Change Log

Published Date	Status (Baseline, Revision, Cancelled)	Document Version Number	Page(s) Affected	Description of Revision (Include Document Name and Reason for Change)	Author
6/16/22	Revision			Add change management log, update points of contacts, formatting	Matt Johnson
7/14/22	Revisions		6,8, 9,11,13,18,19,25,27,	Added another ex. of waste label, clarifications wording and what SOPs to reference	Zulie Navarrete
Approvals:		Signature:			Date:
EHS Director					

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Regulatory Requirements Cross-Reference

<p><i>In accordance with WAC 173-303-235, The laboratory management plan must contain two parts with a total of nine elements identified in WAC 173-303-235(15)(a) and (b). In Part I of its laboratory management plan, an eligible academic entity must describe its procedures for each of the elements listed in (a) of this subsection. An eligible academic entity must implement and comply with the specific provisions that it develops to address the elements in Part I of the laboratory management plan. In Part II of its laboratory management plan, an eligible academic entity must describe its best management practices for each of the elements listed in (b) of this subsection.</i></p>	
Requirement	Document Section
<p><u>Part I - WAC 173-303-235(15)(a)</u> 173-303-235(15)(a)(i): Describe procedures for container labeling in accordance with subsection (7)(a) of this section, as follows: (A) Identifying whether the eligible academic entity will use the term "unwanted material" on the containers in the laboratory. If not, identify an equally effective term that will be used in lieu of "unwanted material" and consistently by the eligible academic entity. The equally effective term, if used, has the same meaning and is subject to the same requirements as "unwanted material."</p>	1.1
<p>(B) Identifying the manner in which information that is "associated with the container" will be imparted.</p>	1.1

173-303-235(15)(a)(ii): Identify whether the eligible academic entity will comply with subsection (9)(a)(i) or (ii) of WAC 173-303-235 for regularly scheduled removals of unwanted material from the laboratory.	1.2
Part II - WAC 173-303-235(15)(b) 173-303-235(15)(b)(i): Describe its intended best practices for container labeling and management (see the required standards in subsection (7) of this section).	2.2
173-303-235(15)(b)(ii): Describe its intended best practices for providing training for laboratory workers and students commensurate with their duties (see the required standards in subsection (8)(a) of this section).	2.6
173-303-235(15)(b)(iii): Describe its intended best practices for providing training to ensure safe on-site transfers of unwanted material and hazardous waste by trained professionals (see the required standards in subsection (8)(d)(i) of this section).	2.7
173-303-235(15)(b)(iv): Describe its intended best practices for removing unwanted material from the laboratory, including: (A) For regularly scheduled removals - Develop a regular schedule for identifying and removing unwanted materials from its laboratories (see the required standards in subsection (9)(a)(i) and (ii) of this section). (B) For removals when maximum volumes are exceeded: (I) Describe its intended best practices for removing unwanted materials from the laboratory within ten calendar days when unwanted materials have exceeded their maximum volumes (see the required standards in subsection (9)(d) of this section). (II) Describe its intended best practices for communicating that unwanted materials have exceeded their maximum volumes.	2.8
173-303-235(15)(b)(v): Describe its intended best practices for making dangerous waste determinations, including specifying the duties of the individuals involved in the process (see the required standards in WAC 173-303-070(7) and subsections (10) through (13) of this section).	2.9
173-303-235(15)(b)(vi): Describe its intended best practices for laboratory clean-outs, if the eligible academic entity plans to use the incentives for laboratory clean-outs provided in subsection (14) of this section, including: (A) Procedures for conducting laboratory clean-outs (see the required standards in subsection (14)(a)(i) through (iii) of this section); (B) Procedures for documenting laboratory clean-outs (see the required standards in subsection (14)(a)(iv) of this section).	2.10
173-303-235(15)(b)(vii): Describe its intended best practices for emergency prevention, including: (A) Procedures for emergency prevention, notification, and response, appropriate to the hazards in the laboratory;	2.11, UPS Emergency Response Plan
(B) A list of chemicals that the eligible academic entity has, or is likely to have, that become more dangerous when they exceed their expiration date and/or as they degrade;	2.11, Chimera
(C) Procedures to safely dispose of chemicals that become more dangerous when they exceed their expiration date and/or as they degrade; and	2.11
(D) Procedures for the timely designation of unknown chemicals.	2.9

Introduction and Applicability

The purpose of this Laboratory Management Plan (LMP) is to standardize the management of materials discarded at the University of Puget Sound (UPS) educational and research laboratories, laboratory-support wastes, and wastes from the Art Department studios and workshops that are covered by the alternative requirements for eligible academic laboratories under the Washington State Dangerous Waste regulations, WAC 173-303-235, and the Federal Resource Conservation and Recovery Act (RCRA) regulations under 40 CFR 262 Subpart K. The alternative requirements for eligible academic laboratories establish an alternate process for managing laboratory wastes. These alternative requirements offer a different way to manage wastes from the traditional regulations and procedures established by RCRA for industrial generators of hazardous waste.

The alternative requirements for eligible academic laboratories allow more flexibility to academic entities in certain areas that are unique to their operation. Effective January 18th, 2015, the Washington State Department of Ecology (Ecology) has implemented¹, and is authorized by the US Environmental Protection Agency (USEPA) to offer the alternative requirements for eligible academic laboratories in Washington State. Henceforth, this LMP is meant to be in compliance with WAC 173-303-235 and by doing so, will be in compliance with 40 CFR 262 Subpart K.

Ecology has determined that any institution (college or University) who wants to opt into the alternative requirements for eligible academic laboratories meet the following definition: “A private or public, post- secondary, degree-granting, academic institution, that is accredited by an accrediting agency listed annually by the U.S. Department of Education”.

UPS is an eligible academic entity under this definition and therefore can manage its dangerous wastes pursuant to the alternative requirements. UPS has modified the management process of its hazardous waste to comply with this alternate set of regulations.

It is important to note that the waste management process described in this LMP applies only to laboratories as defined in Section 2. It does not apply to other operations, shops, or generators on the UPS Campus who will continue to follow the normal generator standards under WAC 173-303.

Table 2 below displays what is and what is not a laboratory under the alternative requirements. Under these restrictions, UPS will be managing the following locations under the alternative requirements:

- All laboratories in Harned Hall;
- All laboratories in Thompson Hall;
- The Art and Lithography studios at Kittredge Hall;
- The Ceramics building studios

- The Metal Art building studios.
- All Weyerhaeuser Hall laboratories

¹ Statutory Authority: Chapter [70.105](#) RCW. WSR 15-01-123 (Order 13-07), § 173-303-235, filed 12/18/14, effective 1/18/15

What is a laboratory under the alternative requirements?	Yes	No
Teaching and research labs	✓	
Art Studios	✓	
Photo Labs	✓	
Field Labs	✓	
Diagnostic Labs in Teaching Hospital	✓	
Areas that support labs (e.g., chemical stockrooms & prep rooms)	✓	
Chemical stockrooms that do not support labs		✓
Vehicle maintenance areas		✓
Machine shops		✓
Print shops		✓
Commercial photo processing		✓
Power plants		✓

Table 2: Eligible Labs under the Alternative Requirements

Definitions

AUTHORIZED REPRESENTATIVE means the person responsible for the overall operation of a facility or an operational unit (i.e., part of a facility), e.g., the lab manager, superintendent or person of equivalent responsibility.

CENTRAL ACCUMULATION AREA means an on-site dangerous waste accumulation area subject to either WAC 173-303-200 (large quantity generators) or 173-303-201 (medium quantity generators - persons who generate more than 220 pounds but less than 2,200 pounds or dangerous waste; and less than 2.2 pounds or 1 quart of acutely hazardous waste per calendar month). A central accumulation area at an eligible academic entity that chooses to be subject to this section must also comply with subsection 2.7 of this section when accumulating unwanted material and/or dangerous waste.

COLLEGE/UNIVERSITY means a private or public, postsecondary, degree-granting, academic institution, that is accredited by an accrediting agency listed annually by the U.S. Department of Education.

ELIGIBLE ACADEMIC ENTITY means a college or university, or a nonprofit research institute that is owned by or has a formal written affiliation agreement with a college or university, or a teaching hospital that is owned by or has a formal written affiliation agreement with a college or university.

ENVIRONMENTAL HEALTH AND SAFETY OFFICE (EHS) means the University of Puget Sound

Environmental Health and Safety Office. This is inclusive of references to the EHS Environmental Health and Safety Director or Occupational Health and Safety Manager who has primary responsibility for compliance with waste management and laboratory safety at the University of Puget Sound.

FORMAL WRITTEN AFFILIATION AGREEMENT for a nonprofit research institute means a written document that establishes a relationship between institutions for the purposes of research and/or education and is signed by authorized representatives from each institution. A relationship on a project-by-project or grant-by-grant basis is not considered a formal written affiliation agreement.

LABORATORY means an area owned by an eligible academic entity where relatively small quantities of chemicals and other substances are used on a nonproduction basis for teaching or research (or diagnostic purposes at a teaching hospital) and are stored and used in containers that are easily manipulated by one person. Photo laboratories, art studios, and field laboratories are considered laboratories. Areas such as chemical stockrooms and preparatory laboratories that provide a support function to teaching or research laboratories (or diagnostic laboratories at teaching hospitals) are also considered laboratories.

LABORATORY CLEAN-OUT means an evaluation of the inventory of chemicals and other materials in a laboratory that are no longer needed or that have expired and the subsequent removal of those chemicals or other unwanted materials from the laboratory. A clean-out may occur for several reasons. It may be on a routine basis (e.g., at the end of a semester or academic year) or as a result of a renovation, relocation, or change in laboratory supervisor/occupant. A regularly scheduled removal of unwanted material as required by subsection 2.10 of this section does not qualify as a laboratory clean-out.

LAB WASTES (UNWANTED MATERIAL) means any chemical, mixtures of chemicals, products of experiments, or other material from a Laboratory, as defined, that is no longer needed, wanted, or usable in the laboratory and that is destined for hazardous waste determination by a trained professional. *Lab Wastes*, the term used by the University of Puget Sound for *Unwanted Materials* as defined under 49 CFR 262, Subpart K, includes reactive and/or acutely hazardous unwanted materials and materials that may eventually be determined not to be solid waste pursuant to 40 CFR 261.2, or a hazardous waste pursuant to 40 CFR 261.3. If an eligible academic entity elects to use another equally effective term in lieu of “unwanted material,” as allowed by 40 CFR §262.206(a)(1)(i); as in this case, the term, “Lab Waste”, the equally effective term has the same meaning and is subject to the same requirements as “unwanted material” under this subpart as it applies to the University of Puget Sound.

LABORATORY WORKER means a person who handles chemicals and/or unwanted material in a laboratory and may include, but is not limited to, faculty, staff, postdoctoral fellows, interns, researchers, technicians, supervisors/managers, and principal investigators. A person does not need to be paid or otherwise compensated for his/her work in the laboratory to be considered a laboratory worker. Undergraduate and graduate students in a supervised classroom setting are not laboratory workers.

NONPROFIT RESEARCH INSTITUTE means an organization that conducts research as its primary function and files as a nonprofit organization under the tax code of 26 U.S.C. 501(c)(3).

REACTIVE ACUTELY HAZARDOUS UNWANTED MATERIAL means an unwanted material that is one of the acutely hazardous commercial chemical products listed in WAC 173-303-9903 for reactivity.

TEACHING HOSPITAL means a hospital that trains students to become physicians, nurses, or other health or laboratory personnel.

TRAINED PROFESSIONAL means a person who has completed the applicable dangerous waste training requirements of WAC 173-303-200 (1)(e)(i) for large quantity generators or is knowledgeable about normal operations and emergencies in accordance with WAC 173-303-201 (2)(c) for generators regulated under WAC 173-303-201 and small quantity generators. A trained professional may be an employee of the eligible academic entity or may be a contractor or vendor who meets the requisite training requirements.

WASTE VENDOR means, for purposes of this Plan and RCRA hazardous waste management on the University of Puget Sound, the chemical waste vendor retained by the University of Puget Sound to assist in hazardous waste determinations, bulking, packaging, labeling, and transportation for proper off-site disposal of hazardous and non-hazardous chemical and biological wastes. The *field chemists* employed by this contractor meet the minimum qualifications as *trained professionals* under this Laboratory Waste Management Plan.

WORKING CONTAINER means a small container (i.e., two gallons or less) that is in use at a laboratory bench, hood, or other work station, to collect unwanted material from a laboratory experiment or procedure.

Part 1: Procedures

1.1 Waste Container Labeling

This section will explain the minimum requirements for labeling containers used to store Lab Wastes (unwanted materials) in UPS laboratories and art studios/workshops. The requirements established in this section are compulsory and must be applied in all academic laboratory and art departments.

Please refer to the definitions sections for the definition of lab waste. UPS has decided to include in this definition of unwanted materials all chemical substances that are expired (store-room coordinators may decide to increase the shelf-life of any chemical to any time period if they can determine a lab use beyond the manufacturer's recommendations), used, or generated due to experiments, artwork, or educational demonstrations unless determined otherwise by the laboratory or art studio worker, or until a formal determination is performed by the UPS EH&S manager or Chemical Hygiene Officer. Laboratory and art department staff and faculty may decide at any point to allow another department to transfer/repurpose the chemical instead of discarding the chemical products, as an encouraged waste minimization practice.

A label or tag (or one or more labels) will be used to identify unwanted materials in the laboratories, except provided otherwise hereunder. All containers used to store unwanted materials MUST be labeled. At a minimum they will contain the following information:

All containers of Lab Waste (“unwanted materials”) must be labeled with:

Affixed or Attached to the Container:

1. The words “Lab Waste”; and,
2. Risk label that conveys information to about the contents and hazards of the container (e.g., name or list of chemicals or hazard classes)

All waste containers must also have the following information either directly on the container, or associated with the container label:

Associated With Container Label – May be Affixed or Attached if Desired:

3. Information sufficient to make a Hazardous Waste determination;
4. Accumulation Start date of the container

The preferred method for conveying the above-required information is through the use of a standard UPS Lab Waste Label which exhibits all of the necessary information, including the words LAB WASTE, and the Accumulation Start Date, as well as information adequate to both inform emergency responders of the hazards presented by the waste, and sufficient information to make a hazardous waste determination. The latter information is provided through both a listing of the waste components, and a checklist of hazard properties presented by the waste. The list may or may not be immediately attached to the container. An example of the standard UPS lab waste label is shown in Figure 1.

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Figure 1: Example UPS Lab Waste Labels

LABORATORY WASTE

Accumulation Start Date: _____ Dept.: _____ Bldg. /Rm: _____

Contact _____ Phone: _____ email: _____

Waste name: _____


Chemical composition:	%	Composition	%

Hazard properties (check any that apply)

Toxic Flammable Non-Hazardous Corrosive P-listed

Other Explain _____

Wastes must be removed within 6 months of the start of Accumulation



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For Waste Pick-up please submit work order to Facilities services.

For questions contact:

Chemistry dept. labs - 879-3350

Biology dept. labs -879-3302

All other locations contact EHS Dept:
879-3933 or 879-2778

**WARNING
MAY FORM EXPLOSIVE
PEROXIDE**

Store, handle, and dispose with caution. Store in tightly closed original container. Avoid exposure to light, air and heat. If crystals, discoloration, or layering are visible, do not open. Contact EH&S for assistance (879-3933)

Date Received: _____

Date Opened: _____

Peroxide Test Results

Discard or test every ___ months
If > 100ppm, avoid use & contact
EH&S.

Date: _____ <100ppm
 >100ppm

Date: _____ <100ppm
 >100ppm

The Lab Waste label should be applied directly to the container if possible, but if not possible due to size or visibility restrictions, it may be applied to a tag that is then attached to the container or placed on an outer container accommodating the subject waste container.

ASSOCIATED WITH INFORMATION: If adequate information to make a hazardous waste determination is not or cannot be displayed on the *UPS Lab Waste Label*--the trained laboratory, studio, or stock room personnel may utilize a reference system that allows tracking the information back to a specific container such as a spreadsheet, log book, or electronic storage.

ORIGINAL LABEL OPTION: The original manufacturer label may be used. This label must be located on the original container and must continue to exhibit the container contents. However, it is important to clarify that it can only be used as an alternate label if it is in good condition. Good condition means that is clearly readable, all warnings and contents are visible, and remain accurate and applicable to the contained material that is now a waste. The laboratory worker must add the word LAB WASTE to the container and the accumulation start date. This is NOT an approved option if any chemical materials other than the ones stated on the original label are

stored in the container. The information to be Associated with the Label, must still be provided— either on the container itself, or associated with the container. The label shown in Figure 2 can be used to place on original labels when it becomes lab waste.

Figure 2: Lab Waste Labels for Original Containers

LAB WASTE

Accumulation Start Date: _____ **Dept.:** _____ **Bldg. /Rm:** _____

Contact _____ **Phone:** _____ **email:** _____

Waste name: _____

1.2 Non-Waste Container Labeling

Non-waste chemical containers must always be labeled with one of the following labeling schemes:

1. Original Manufacturer Label: The original, manufacturer labels on hazardous chemicals that are entering the laboratory may not be removed or defaced. Containers should be labeled with the date received and the date opened.
2. Secondary Label: If a chemical is removed from its original container and placed into another container (e.g., beaker, flask, vessel) the following information must be present:
 - a. Full name(s) of the chemical(s)
 - b. If the container holds a solution or mixture, list concentrations and solvents used
 - c. Hazard properties of the chemical/solution (e.g., toxic, flammable, reactive)
 - d. Date of preparation or transfer

1.3 Removal of Lab Wastes

Waste containers, regardless of the remaining capacity of the container, must be removed for disposal within required timeframes, or based on total quantities accumulated in a particular laboratory, stock room, or studio.

Time Limit (6 Months): Unwanted materials will be removed from the laboratory using a rolling 6 months approach. That is, each container must be removed within 6 months from the container’s accumulation start date.

Quantity Limits: Regardless of the above time limit for the accumulation of Lab Wastes in a particular laboratory or studio, if either of the following total waste quantity limits are exceeded, the wastes must be removed expeditiously:

- 55-Gallon Maximum: If a particular laboratory, studio, or support area accumulates a

total volume of unwanted material in excess of 55 gallons, then all containers of unwanted material in the laboratory, studio, or support area will be removed within 3 calendar days of the date that 55 gallons was exceeded.

- Acutely hazardous and P-listed waste maximum – 1 Kg or 1 Liter (~1 quart): If a laboratory accumulates more than 1 liter of an acutely hazardous or P-listed waste, including any of the below P- listed reactive acutely hazardous lab wastes, then all containers of reactive acutely hazardous unwanted material must be removed from the laboratory within 10 calendar days of the date that 1 liter was exceeded. Acutely hazardous wastes also include wastes that designate as WT01 under the Washington State Toxic Criteria. P-listed waste includes only waste that is in original manufacturer containers where the chemical is a sole active ingredient. P-listed wastes are not “spent” wastes or wastes that have been used or altered in any way.

6 examples of P-listed or Acutely Hazardous Lab Waste are:

- *P003 – Acrolein*
- *P005– Allyl Alcohol*
- *P075 – Nicotine*
- *P077– 4-Nitroaniline*
- *P102 – Propargyl Alcohol*
- *P105 – Sodium Azide*

Laboratories that generate more than 55 gallons of each waste stream unwanted materials, 1 liter, or 1 Kg of acutely hazardous unwanted materials, will need to mark on the subject containers the date the threshold volume of unwanted material is reached. The Department, or the EHS Office, must be immediately contacted in order to remove the accumulated waste within the required 10-day timeframe. The laboratory workers, instructors, researchers, or graduate assistants assigned to each generation point are responsible for complying with all EPA/WDOE requirements, as well as requirements established by the EHS Office. It is the Science or Art department’s responsibility to ensure compliance with all federal, state, and EHS requirements, including appropriate labeling, use of correct containers, notification times, and requests for Lab Waste removal.

1.4 Hazardous Waste Determinations for Unwanted Materials

Once the unwanted materials are removed from the laboratory by a *trained professional*, the hazardous waste determination will be made in the Central Accumulation Area (CAA) within four (4) days of the unwanted materials arriving at this location. All applicable requirements for generators will be observed in the CAA. The hazardous waste determination may also be made by a *trained professional* while the unwanted material is at the source location at the laboratory.

Note: Pursuant to WAC 173-303-235(16), Lab Waste that does not meet the definition of solid waste or dangerous waste in WAC 173-303-016 is no longer subject to the Dangerous Waste regulations or this Laboratory Management Plan, and must be managed in compliance with other

applicable regulations and in a manner that is protective of human, health, and the environment.

Part 2: Best Management Practices

2.1 Best Management Practices (BMP)

This section of the document will discuss the *Best Management Practices* that will be applicable to all areas that generate unwanted material. The selection, implementation, and verification of these BMPs will be the primary responsibility of the department or location generating the lab wastes. EHS will provide technical support and assistance to the various departments, laboratories, studios, workshops, and associated support functions. The following procedures are not directly enforceable by the USEPA, WDOE, or other regulatory authorities, but need to be followed to ensure compliance with the *Enforceable* procedures established in Section 1 of this *Laboratory Waste Management Plan*. Oversight of these BMPs and procedures will be performed by the UPS's EHS Office.

2.2 Container Labeling and Management

The University of Puget Sound will use, whenever possible, the following label for all LAB WASTES generated by laboratory operations and art activities. As discussed in Section 1.1, this label meets or surpasses all of the required EPA/WDOE criteria for labeling of Unwanted Materials (Lab wastes).

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LABORATORY WASTE

Accumulation Start Date: _____ Dept.: _____ Bldg. /Rm: _____

Contact _____ Phone: _____ email: _____

Waste name: _____


Chemical composition:	%	Composition	%
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Hazard properties (check any that apply)

Toxic Flammable Non-Hazardous Corrosive P-listed

Other Explain _____

Wastes must be removed within 6 months of the start of Accumulation



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For Waste Pick-up please submit work order to Facilities services.

For questions contact:

Chemistry dept. labs - 879-3350

Biology dept. labs -879-3302

All other locations contact EHS Dept:
879-3933 or 879-2778

Instructions for completing the LAB WASTE Label are provided below. You should contact a *trained professional* in your department or the EHS Office if you have any labeling questions.

Contact the EHS Office if your department, lab, or studio needs an initial or additional supply of these labels. (znavarrete@pugetsound.edu 879-2778 and/or Mattjohnson@pugetsound.edu 879-3933)

LAB WASTE LABEL INSTRUCTIONS

Accumulation Start Date: This is the date that wastes are first placed into the container – or, if transferring waste to a new container (larger, different type, etc.), the *start of accumulation date* from the original waste container.

Department: Name of the Department in which the waste was generated; e.g., Biology, Chemistry, Art department etc.

Building/Room: The Building and Room in which the waste is being, or was, generated; e.g., TH 036, Harned 214, etc.

Contact: The name of the lab or studio worker, student, instructor, or researcher responsible for the generated waste and container.

Phone: The phone number (or, email if preferred) of the contact person responsible for the waste.

Waste Name: Common name for the waste material. A few examples:

Halogenated solvents	Aliphatic solvents	Aqueous toxic
Acetone	Sulfuric acid	Expired test kit
Extraction solvents	Water test ampoules	Vacuum pump oil
Diethyl Ether	Mixed caustics	Expired amines
Algal culture media	Unused benzene	Ethidium bromide
Contaminated ethanol	Sodium azide	Calcium flakes in mineral oil
Waste ceramic glaze	Linseed oil	Paints (oil-based)

If the waste is expired, excess, or an unused chemical or compound for another reason, that information should be added to the Waste Name, e.g., expired formic acid, or unused methyl hydrazine).

Chemical Composition: List the known or approximate chemical composition of the wastes in the container. The percentage present should equal 100. Example:

Chemical Composition:	mls or %
<i>Acetone</i>	<i>30</i>
<i>Hexane</i>	<i>40</i>
<i>Xylene</i>	<i>20</i>
<i>Organic solids</i>	<i>10</i>

Hazard Properties (check all that are applicable to the waste): The following relates the basic physical or health properties of the hazard categories listed. This information is necessary to declare the hazards of a waste and aid in determining whether or not the waste material is a *Hazardous Waste* for handling and disposal purposes. Often the hazard class can be found by checking the Safety Data Sheet(s) or original containers for the chemical constituents in the waste.

Poison: A waste that either exhibits *Toxic* hazards as defined below or is otherwise designated a poison based on shipping labels on the constituent containers, on Safety Data Sheets, or container labels related to the contents of the waste container.

Heavy Metal: This refers to the 8 RCRA metals – Arsenic (As), Barium (Ba), Cadmium (Cd), Chromium (Cr), Mercury (Hg), Lead (Pb), and Selenium (Se), and Silver (Ag). If present in the waste

in appreciable amounts, name the metal and its approximate concentration.

Flammable: Liquids having a flashpoint of less than 140°F. For solids--may cause a fire through friction; show a burning rate faster than 2.2 mm (0.087 inches) per second; or any metal powders that can be ignited and react over the whole length of a sample in 10 minutes or less.

Naphthalene, matches, aluminum powder, and magnesium are examples of flammable solids.

Oxidizer: Any compound that spontaneously evolves oxygen at room temperature or under slight heating. The term includes such chemicals as chlorates, perchlorates, nitrates, and permanganates. Peroxide-formers should be checked separately where indicated

Corrosives: Acids and bases or mixtures having a pH less than or equal to 2 or greater than or equal to 12.5, and materials that burn the skin or dissolve metals. Examples are strong mineral acids (chromic, sulfuric, hydrochloric, or nitric) strong alkalis (potassium hydroxide, sodium hydroxide), rust removers, and acid or alkaline cleaning fluids. Specify the pH of the waste where indicated if known or a potential hazard. The presence of perchloric or hydrofluoric acid should also be noted in the *Waste Name* or *Other* category.

Reactivity: A waste material, other than an explosive, which will vigorously polymerize, decompose, condense, or become self-reactive and undergo other violent chemical changes, including explosion, when exposed to heat, friction or shock, or in the absence of an inhibitor, or in the presence of contaminants or in contact with incompatible material. Check if the material is air or water reactive. Also, check and provide the concentration of any cyanides or sulfides in the waste. A waste is hazardous if it is a cyanide- or sulfide-bearing waste which generates toxic gases or vapors at a quantity sufficient to present a health or physical danger.

Carcinogen: Any substance or agent capable of causing or producing cancer in mammals, including humans. A chemical is considered to be a carcinogen if it has been listed as such by the International Agency for Research on Cancer (IARC), by the National Toxicology Program (NTP) (latest edition), or if it is regulated by OSHA as a carcinogen.

Irritant: A chemical/material that causes a reversible inflammatory effect on living tissue, and may cause soreness, redness or discomfort.

Sensitizer: A chemical that causes a substantial proportion of exposed people or animals to develop an allergic reaction in normal tissue after repeated exposure to the chemical.

Solvents: Identify if the waste contains materials that were used as a solvent or extraction fluid – either halogenated (methylene chloride, chloroform, trichloroethylene, dichloroethylene, Tetrachloroethylene, 1,1,1- trichloroethane, carbon tetrachloride, chlorinated fluorocarbons, etc.); or non-halogenated (Xylene, acetone, ethyl acetate, ethyl benzene, ethyl ether, methyl isobutyl ketone, n-butyl alcohol, cyclohexanone, and methanol, etc.).

Acutely Toxic: All the items on the RCRA P list and six on the F list (F020, F021, F022, F023, F027 and F027) are classified as “acute” hazardous wastes because small amounts may cause severe health effects. In addition, in Washington State, any waste that designates as WT01 is considered acutely toxic. The significance of acutely toxic wastes are not only the increased

hazards and safety risks, but also the impact to generator status. If a generator stores or generates greater than 1 kg (2.2 lbs.) of acutely hazardous waste, then the generator is a Large Quantity Generator for the month in which the acutely toxic waste was generated or stored.

Peroxide Formers: Organic peroxides are potentially unstable organic chemicals that contain the characteristic peroxide (-O-O-) bond. Peroxides can be formed when commonly used laboratory chemicals with the potential to form peroxides react with air, moisture, or impurities. Organic peroxides can be sensitive to shock, sparks, heat, friction, impact, and light. These include acetal, acrylonitrile, butadiene, cyclohexene, cyclopentene, decalin, diacetylene, dicyclopentadiene, dioxane, ethylene glycol diethyl ether, furan, isopropyl ether, methyl isobutyl ketone, methyl acetylene, methyl cyclopentane, methyl methacrylate, styrene, sodium amide, tetrahydrofuran, tetrahydronaphthalene, vinyl acetate, vinyl acetylene, vinyl chloride, and vinyl ethers.

Biohazard: An agent of biological origin (e.g., all infectious organisms, their toxins, allergens of biological origin, and genetic fragments) that has the capacity to cause ill-effects in humans.

Explosive: The term "explosive" or "explosives" includes any chemical compound or mechanical mixture which, when subjected to heat, impact, friction, shock, detonation or other suitable initiation, undergoes a very rapid chemical change with the evolution of large volumes of highly heated gases which exert pressures in the surrounding medium. The term applies to materials that either detonate or deflagrate. Explosive wastes do not appear as a label hazard as such materials should be immediately brought to the attention of the UPS's EHS Office for proper handling.

Other: Can include any other hazard not listed.

Non-Hazardous: Many chemicals and compounds would not constitute hazardous wastes, only a very few examples include neutralized caustics (pH between 5 and 10), collagen, cytosine, nutrients, starches, cellulose, many biologicals and media, potassium thiosulfate, plasmin, calcium citrate, pectin, and many others. If a trained individual, based on knowledge of the waste contents and characteristics can determine that the waste is not a RCRA Hazardous Waste, this class may be checked. Normally, this determination (refer to waste determination SOP) will be made following removal of the waste by the Chemical Hygiene Officer or field chemists employed by UPS's waste vendor personnel. However, if you are sure the waste is innocuous it may be checked as Non-Hazardous or separately disposed as solid waste. It is the responsibility of the laboratory or studio worker, Instructor, Principal Investigator, or manager within the laboratory or studio to prepare the label(s) completely and verify that labels are placed on all containers of lab wastes stored in the laboratory, studio, or associated storage or preparation room. In order for the container to be removed from a laboratory or studio it must be identified with the required information.

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2.3 Waste Removal

The EHS Office schedules end of semester waste shipments across the campus on the following academic calendar schedule:

1. Mid-July (after the 2nd Summer Session-before Fall semester)
2. December beginning December 20th (during Winter Break)
3. Mid-March (during Spring Break)
4. Mid May (after Commencement)

However, UPS will maintain at least one Central Accumulation Area for the temporary storage and staging of lab wastes and other waste materials on the UPS campus between the quarterly scheduled pickups for off-site treatment and disposal. Trained personnel from your Department may be available to remove wastes at any time when containers are full, if total waste quantities are approaching the limits, or the 6-month removal deadlines are approaching. EHS personnel may also be contacted to remove Lab Wastes if the laboratory or studio places a request for removal by emailing the UPS EH&S Offices at mattjohnson@pugetsound.edu

The removal of lab waste from a laboratory is parallel to, but different from, a *Laboratory Clean-Out* procedure. The clean-out process can only be implemented once a year per laboratory or generation area. Refer to Section 2.10 to come for the *Laboratory Clean-out Process*.

2.4 Lab Waste Containers

The selection of the containers used to hold lab waste will be based on the hazardous characteristic of the lab waste material (refer to waste disposal SOP). The requirements of the containers for subsequent transportation are established by the Department of Transportation (DOT).

Two distinct classes of containers will be used in the laboratory to hold Lab Wastes—*Working*, and *Non-working containers*.

Working containers are defined as: “small containers (i.e., 2 gallons or less) that are in use at a laboratory bench, hood, or other work station, to collect unwanted material from a laboratory experiment or studio procedure. Working containers may remain open until the end of the procedure or shift, or until it is full, at which time the working container must either be closed or the contents emptied into a separate container that is then closed.

Non-working containers are those into which unwanted materials will be deposited and will remain closed except when adding or removing unwanted materials. Working containers will not exceed 2 gallons while non-working containers shall not exceed the five gallons mark. The use of larger containers (15-55 gallon) may be approved on a case-by-case basis by the EHS Office.

As stated above, lab waste containers must be kept closed at all times unless adding, removing,

or bulking waste, or:

1. When venting of a container is necessary;
2. For the proper operation of laboratory equipment, such as with in-line collection of lab waste from high performance liquid chromatographs; or,
3. To prevent dangerous situations--such as build-up of extreme pressure.

For the safe and suitable handling of all lab waste, but especially of the potentially hazardous waste materials that are generated in the laboratories and some art studios or workshops, it is essential to select the appropriate containers. The following provides guidelines for the appropriate selection of containers to be used for the handling of unwanted materials at the laboratories:

- The most appropriate container for the different types of lab wastes should be used.
- Separate containers for non-hazardous lab wastes, biomedical, and radioactive waste mixtures, among others should be used.
- Under no circumstances is the use of food, beverage, or household containers suitable for the storage of lab or studio wastes!
- Separate containers for liquids, solids, and gases should be used (i.e. don't mix liquids and solids unless absolutely necessary, and if the material is chemically compatible).
- Containers that are compatible with the properties of the materials to be contained, considering possible secondary reactions, should be used.
- Plastic and glass containers should be used for lab waste handling. These can either be new or reused containers of chemical substances used in the laboratories.
- Containers must be clean and free of polluting agents and must have their original caps or closures.
- Plastic containers should be made of polyethylene (HDPE or LDPE), polypropylene, polystyrene (PET), polymers of vinyl, or TEFLON, such as polytetrafluoroethylene (PTFE) and fluorinated ethylene propylene (FEP).
- Glass containers of chemical substances can be reused (i.e. soda lime) or glassware made especially for laboratory use by known brands, such as Pyrex, Corning, and Kimble. Glass non-working containers for liquid unwanted materials can range in size from 500 ml up to 3.78 L (1 gallon). Preferably, 2.5 liters and 1 gallon containers must have an ear-like handle. The use of glass containers with a capacity superior to 1 gallon will not be allowed.
- Plastic non-working containers for liquid lab wastes can range in size from 500 ml up to 5 gallons. Containers with a capacity that surpasses 5 gallons will only be allowed in those laboratories where the volume of 5 gallons is attained in 5 days.
- Plastic or glass containers for solid lab wastes can range in size from 250 g up to 2.2 Kg (5 pounds). The use of containers with a capacity that exceeds 2.2 Kg (5 pounds) will not be allowed.
- Metal containers should never be used for corrosive or aqueous lab wastes. These metal containers will not be used as secondary containments for liquid wastes. Polyethylene

containers must not be used for chlorinated solvents.

- Use separate containers for lab wastes that can be recycled or that can easily be treated in the laboratory (for example: basic neutralization of acids and strong bases) to prevent excessive waste generation.
- Avoid, when possible, mixing chlorinated and non-chlorinated solvents or extraction agents in the same waste container.
- Avoid mixing oil-based and water-based solvents, paints, and coatings in the same container.

EHS will provide technical guidance and assistance to all areas. Prior to their removal from the laboratory, these containers must be clean and properly labeled in accordance with section 1.1 of this Plan. Labels that are not in good condition should be replaced.

All non-working containers holding lab wastes in liquid form will be kept in a designated area in the laboratory or studio. In addition, the cabinets used to store chemicals must be classified in accordance with their chemical properties. Incompatible chemicals will be stored separately to prevent any chemical reaction. In the selection and acquisition of chemical storage cabinets, their characteristics must be considered.

Lab wastes, like all chemicals, must be stored in accordance with local and International Fire Code standards and not exceed the maximum quantities allowed in a particular room or control area. No chemicals, including wastes, should be stored on the floor or in a manner that obstructs aisles or exits. Please refer to Appendix A for tips regarding the proper handling of lab containers, ranging from waste characterization to inspection.

2.5 Training for Laboratory Workers

All laboratory workers, including student workers, must be trained. The training must be commensurate with their duties, so the employees, technicians, faculty, researchers, assistants, and student workers understand the requirements in this plan and can implement them. The following classifies laboratory workers relative to the level and nature of training to be provided:

Laboratory/Studio Workers	Level of Training*	Training Methods
Instructor/Faculty member Student/research worker	Lab Safety Training	PowerPoint Presentation/Videos
Researcher	Lab Safety Training	PowerPoint Presentation/Videos
Stock room/Lab Waste Coordinators / Trained Professionals	Lab Safety Training and Waste Management	Presentation by UPS EHS Director/Occup. Health and Safety Manager/Contracted Environmental trainer

**The training to be provided to School of Art workers and students engaged in studio and workshop endeavors includes the same module on Lab Waste Management. This training is entitled, "Art Studio and Workshop Safety Training".*

The UPS Lab (and Art Studio) Safety Training includes a module on Lab Waste generation and handling and the procedures contained in this *Laboratory Management Plan*. This training is applicable to all UPS science laboratory and art studio workers.

Different methods are planned for the development and deployment of the laboratory and studio wastes. The departments are responsible for coordinating the necessary training for their laboratory and art studio workers and student workers every Semester. Training resources will be provided by EHS for those laboratory workers unable to attend classroom training.

While training records are not required for Small Quantity Generators (such as UPS if the generator status is lowered from MQG to SQG) under RCRA Subpart K, it is intended that the various science and art departments utilizing laboratories and studios will maintain such records as part of their overall employee/student worker safety training records.

2.6 Training for Trained Professionals

The *Lab Waste Coordinators* identified in the preceding Table are considered to be *Trained Professionals* under the alternative laboratory requirements as they may make hazardous waste determinations in the laboratory or studio settings or may accompany or oversee the transfer of Lab Wastes to the CAA upon removal. Additional training is provided to these individuals by the UPS EHS Director and also serves as the Chemical Hygiene Officer. The EHS Director also serves as a *Trained Professional* and is considered qualified and trained for that function. To comply with the requirements of Subpart K, as well as over-see the safe on-site transfers of laboratory wastes, only trained professionals will:

1. Accompany the transfer of Lab Wastes (unwanted material) when they are removed from the laboratory, studio, or support area; either for consolidation in another laboratory or chemical stockroom, or taken to the CAA; and,
2. Make the hazardous waste determination at the CAA, pursuant to §262.11 and WAC 173-303 for Lab Wastes (unwanted materials).

The EHS Director may receive training in RCRA, OSHA HAZWOPER, Hazard Communication, GHS, DOT Hazardous Materials, OSHA Laboratory Safety Standard, the UPS Chemical Hygiene Plan, and other regulatory programs, documents, plans, and requirements. Training will continually be refreshed and expanded as necessary using classroom, video presentations, web-based, and other training methods.

2.7 Removing Unwanted Materials from the Laboratory

As previously mentioned, the principal method to remove unwanted material from the laboratory will be time based using a 6 month rolling approach.

To ensure that a container does not exceed the six month limit in the laboratory, a UPS Lab Waste label, or one of the expressed options allowed in Section 1.1, any of which include display of the accumulation start date on the container, will be required. Having this information on each container will allow for the time a container of unwanted material remains in a laboratory to be monitored. Once the container is nearing its 180-day time limit in the laboratory, or is otherwise ready to be picked up, a trained professional in the Department or the EHS Office will be notified. The trained professional will then proceed to transfer, or oversee the transfer, of the container from the laboratory, studio, workshop, or associated area where it was generated to the CAA and make the hazardous waste determination.

If 55 gallons of lab waste or one quart of acutely reactive unwanted material volume limit is reached in the laboratory, the laboratory worker will immediately notify the Department's trained professional or the EHS Office to alert them of the volume being exceeded. EHS personnel will assign priority status to the laboratory to ensure that the unwanted materials are removed within ten calendar days.

The removal of most lab wastes, however, will be associated with the quarterly chemical waste pickups which are announced throughout the university 2-3 weeks prior to the date of the scheduled waste pickup by UPS's chemical waste contractor. The subject departments, shops, or areas then notify the EHS Office of the location, quantity, and nature of the wastes they plan to have ready for pickup on the scheduled dates. In this way, the largest volume of Lab Waste hazardous waste determinations can be made in coordination with the UPS chemical waste vendor's trained professionals upon, or within 4 days of, their arrival at the CAA. Wastes that are removed, or arrive at the CAA, before that time will be characterized by the EHS or a department trained professional.

UPS promotes consolidation of compatible lab wastes, allowing containers to be reused whenever possible. The label of the consolidation container must reflect its contents and the earliest accumulation date of the generated substance.

Only trained professionals may over-see the transfer unwanted materials between laboratories or from a laboratory to a chemical stock room for consolidation. Areas consolidating unwanted materials will be subjected to the Subpart K requirements, including the time and volume limits.

2.8 Making Hazardous Waste Determination

Lab-waste will be moved only by EHS authorized personnel to the Central Accumulation Area (CAA). Only the EHS Office and those departments having one or more trained professionals have access to the CAA. Once the unwanted material is moved to the CAA, the hazardous waste determination will be made within four days of the material arriving at the CAA. Within this four-day time frame, EHS personnel can determine that the material is eligible for re-use, recycling, or may be handled as a non-hazardous waste. Any unknown chemicals will be identified

and designated at this time. Those wastes which are determined to constitute hazardous wastes will be labeled as such on the container, along with the relevant EPA hazardous waste code(s). After the hazardous waste determination is made, all applicable requirements in the CAA will continue to apply and be observed as usual.

2.9 Laboratory Clean-out Procedures

Performing a laboratory clean-out procedure is not mandatory and will be directly influenced by the availability of funding to carry out a clean-out. The EHS office, its waste contractor, or the responsible science or art department, will evaluate the laboratory inventory of chemicals and other materials which are no longer needed or that have expired, in order to determine the subsequent removal of those chemicals or other unwanted materials.

Conducting a clean-out will be considered for one of the following reasons:

1. It may be on a routine basis (e.g., at the end of a term or academic year);
2. As a result of a renovation, relocation, or change in laboratory or studio supervisor/occupant; or,
3. A change in the research or studio art endeavor.

The clean-out process allows for the redistribution of the chemicals. If a laboratory worker makes a determination that a chemical can be used in another laboratory, it would be considered a product and thus not considered waste. However, if such a determination is made after it is removed from the laboratory, the clean-out chemical would be regulated as an unwanted material until it is redistributed from the CAA to another laboratory for further use.

The laboratory clean-out process allows the disposal or redistribution of chemical products in a 30-day calendar period. Once a clean-out has been declared, waste resulting from unused commercial chemical products will not be counted toward generator status. Generator status will not be affected by the volume of waste generated during this process. The 30-day period will start when EHS and science stock room personnel in coordination with laboratory or studio personnel begin sorting through and evaluating the inventory of laboratory chemicals, making the corresponding unwanted materials determination. This process will be led by EHS and science stockroom personnel which will develop the clean-out schedule.

Clean-outs may only be performed once every twelve (12) months per laboratory. At the conclusion of the laboratory clean-out, all unwanted materials must be removed from the laboratory.

All records pertaining to a laboratory clean-out including the laboratory being cleaned out, the date the laboratory clean-out begins and ends, and the volume of hazardous waste generated during the laboratory clean-out will be kept in both the EHS office and the stockroom coordinators office. These records will be maintained for a period of three years from the date the clean-out ends.

2.10 Emergency Preparedness

To ensure a quick response in case of an emergency occurring in a UPS laboratory or studio, emergency contact information will be posted in every laboratory, studio, and associated support area on or near the entry doorway. This list will include contact information for both emergency responders on campus and off campus. Evacuation routes will also be posted for every laboratory.

An inventory of all chemical materials in UPS laboratories and art studios will be kept in Chimera. This information is continually being updated and is available to campus administrators and emergency responders through the stockroom coordinators and EHS office. Chemicals that might become dangerous over time, such as peroxide formers, are assigned a one-year expiration date from the date they are first added to the inventory. Once the year time limit is reached, the system will require the user to visually inspect and test the material (testing will need to be documented) and allows for a one-year extension of the expiration date only if the container and content are in good condition. If either the container or content show signs of deterioration, or the development of peroxides, the laboratory worker will notify the EHS and follow the procedure to have the container removed from the laboratory as a Lab Waste for stabilization.

All Laboratories should have an adequate spill response kit. All laboratory personnel must be familiar with this equipment and know how to deploy it. In addition, all personnel must be familiar with the Campus spill response procedures and emergency management (refer to the UPS Emergency Response Plan).

2.11 Laboratory Waste Management Plan Availability

This plan will be made available to laboratory staff and faculty, students, or any others at the University who request it. The Plan will also be maintained and made available by the EHS Office.

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Appendix A. Management of Lab Waste

The guidance in this Appendix was obtained from the Best Management Practices Handbook for Hazardous Waste Containers developed for the Environmental Protection Agency (EPA) Region 6, for the Compliance Assurance and Enforcement Division of EPA Region 6 and adapted by the UPS Environmental Health and Safety Office to fit the university's academic environment.

Tips for Waste Characterization

1. Look at a Safety data sheet (SDS) if it is available either for the product as a whole or its individual components or constituents. Some information areas on the MSDS to look for are physical property, reactivity, fire and explosion hazard, and special protection information.
2. If a product being used in a process meet some or more hazardous characteristics, the waste generated may exhibit some of the same characteristics.
3. Be aware of any changes in a process which could alter the composition of the waste generated.

Tips for Waste Characterization of Containerized Waste

1. Pay attention to marking/labeling which may indicate that a material is flammable, corrosive, etc.
2. Always check with your supervisor before handling unknown containers, or containers which you feel are labeled or marked incorrectly.
3. Look at a material safety data sheet (MSDS) if it is available.
4. If waste is in a plastic container it is a good indication the waste may be corrosive.
5. Special methods and equipment may be required to manage wastes which are:
 - a. Corrosive
 - b. Combustible
 - c. Flammable
 - d. Oxidizer
 - e. Poison
 - f. Toxic
 - g. Reactive

Tips for Container Selection

1. Consult a corrosion resistance guide to determine if the container and waste are compatible.
2. Refer to the U.S. Department of Transportation Hazardous Material website and references for listings of acceptable container types and packaging for the hazardous material.

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Tips for Safely Putting Wastes in Containers

1. Make sure you know which wastes are reactive and/or incompatible. Keep these wastes away from each other. Put them in separate containers.
2. Make sure the container cannot be harmed by the waste.
3. If you rinse out containers onsite, be aware that rinse water generated from container washing must be contained and characterized prior to disposal. Those that contained "P" or "U"-listed constituents must be triple rinsed with suitable solvents prior to disposal or re-use.
4. If you frequently reuse containers, consider "assigning" wastes to certain containers. This will allow you to reuse the container without washing.
5. Use a funnel to prevent spills, and do not use the same funnel for all wastes.
6. Certain chemicals may need room for expansion, or they may require zero headspace depending on the characteristics of the waste and storage conditions (e.g., temperature fluctuations).

Tips for Marking/Labeling Containers

1. Have all personnel use the same method (e.g., prepared labels) to label containers. Make sure all handlers know how to label the containers to convey the identity and nature of the wastes contained therein.
2. Besides the start date and the words "Lab Waste," include information about contents (e.g., toxic, reactive, incompatible).
3. Apply DOT or risk labels to the container when waste is first placed in the container. The label will be in place for shipment and provides information about the waste to drum handlers.
4. Before reusing containers, make sure all old markings/labels are washed off or blacked out.

Tips for Safely Managing Containers

1. Do not store wastes next to a sink or drain in the event of a leak from the container or spillage to the drain.
2. Provide secondary containment (a tub or bucket) for liquid wastes where possible.
3. Use a funnel or hose to add or transfer wastes to containers. This will prevent spills. Remember to rinse the funnel and characterize the rinse water (a dedicated funnel would not have to be rinsed).
4. If you notice a leak, or a container in poor condition, transfer the waste to a new container immediately.
5. Keep containers cool and dry.
6. Make sure all container storage areas are clearly marked -- keep ignitable/reactive wastes in their own area.
7. Don't stack ignitable/reactive wastes.
8. Don't push, roll, or drag containers. Use the right equipment to move the containers and drums.
9. Make sure the containers are easy to reach -- keep an open aisle space so that people and

equipment can move freely.

Tips for Conducting Inspections

1. Be thorough. Check the tops of containers to look for waste residue or corrosion.
2. Look or walk all the way around containers – check the entire container or waste storage or use area.
3. Check containment areas, fume hoods, floors, cabinets, benches, etc. for stains.
4. Note anything unusual in lab or studio area -- even if it might not be a problem.
5. If problems are found, get the problem taken care of immediately – contact facility services department or the EHS Office.

Appendix B: Side by Side Comparison of Satellite Accumulation vs. Alternative Requirements for Eligible Academic Laboratories

	Laboratories that Operate as Satellite Accumulation Areas (SAA)	Laboratories that Operate Under the Academic Laboratories Rule (Subpart K)
Regulatory Citation	<ul style="list-style-type: none"> • 40 CFR 262.34(c) 	<ul style="list-style-type: none"> • 40 CFR Part 262 Subpart K
Applicability	<ul style="list-style-type: none"> • Any SQG or LQG may establish an SAA “at or near any point of generation” 	<ul style="list-style-type: none"> • Any CESQG, SQG or LQG that is an eligible academic entity may opt into Subpart K. • An eligible academic entity is a <ul style="list-style-type: none"> ○ College or university (C/U), or ○ Teaching hospital or non-profit research institute that is owned by or has a formal written affiliation agreement with a C/U
Terminology for regulated materials	<ul style="list-style-type: none"> • Hazardous waste • Acute hazardous waste 	<ul style="list-style-type: none"> • Unwanted material • Reactive acutely hazardous unwanted material
Maximum accumulation time in lab	<ul style="list-style-type: none"> • No time limit, unless maximum accumulation volumes are exceeded (see below) 	<ul style="list-style-type: none"> • Six months
Maximum accumulation volume in lab	<ul style="list-style-type: none"> • 55 gallons of hazardous waste • Total of 1 quart of 124 P-listed acute hazardous wastes 	<ul style="list-style-type: none"> • 55 gallons of unwanted material • Total of 1 quart of 6 P-listed reactive acutely hazardous unwanted materials
Time allowed to exceed maximum volumes in lab	<ul style="list-style-type: none"> • 3 calendar days 	<ul style="list-style-type: none"> • 10 calendar days
Container labeling in lab	<ul style="list-style-type: none"> • “Hazardous waste” or • “Other words that identify the contents of the container” 	<ul style="list-style-type: none"> • “Unwanted material” or “other equally effective term,” and • Information re: contents of the container, and • Sufficient information to make a hazardous waste determination, and • Accumulation start date
Hazardous waste determination	Must be made at the point of generation: <ul style="list-style-type: none"> • In the SAA • When the waste is first generated 	Choice of where and when to make: <ul style="list-style-type: none"> • In the lab, before it is shipped off-site • Within 4 days of arriving at on-site Central Accumulation Area (CAA) • Within 4 days of arriving at on-site TSD

Appendix B (continued): Side by Side Comparison of Satellite Accumulation vs. Alternative Requirements for Eligible Academic Laboratories

	Laboratories that Operate as Satellite Accumulation Areas (SAA)	Laboratories that Operate Under the Academic Laboratories Rule (Subpart K)
Acutes – Hazardous waste determination and generator status	<ul style="list-style-type: none"> Any of 124 P-listed acute hazardous waste codes could apply LQG status if >1 kg/month 	<ul style="list-style-type: none"> Any of 124 P-listed acute hazardous waste codes could apply LQG status if >1 kg/month
Training	<ul style="list-style-type: none"> None required for laboratory personnel Training required for personnel outside of SAA 	<ul style="list-style-type: none"> Training that is “commensurate with duties” is required for lab workers and students in labs Training required for personnel outside of lab (“trained professionals”)
Container management	<ul style="list-style-type: none"> Containers must be in good condition Contents must be compatible with container Containers must be kept closed except: <ul style="list-style-type: none"> When adding or removing waste 	<ul style="list-style-type: none"> Containers must be in good condition Contents must be compatible with container Containers must be kept closed except: <ul style="list-style-type: none"> When adding, removing, or consolidating unwanted materials Working containers may remain open until the end of shift or procedure, whichever is first When venting is necessary
On-site consolidation of containers	<ul style="list-style-type: none"> Transfer of containers between SAAs is not allowed, therefore on-site consolidation of containers may not occur without a 90/180 day area 	<ul style="list-style-type: none"> Transfer of containers between labs is allowed, therefore on-site consolidation of containers may occur without a 90/180 day area
Laboratory clean-outs	<ul style="list-style-type: none"> Maximum volumes are easily exceeded and excess volumes must be removed within 3 days Often results in an increase in generator status (episodic generation) 	<p>Incentives provided to conduct clean-outs: (limited to once per lab per 12 months)</p> <ul style="list-style-type: none"> 30 days to conduct a clean-out Do not have to count hazardous waste from a clean-out toward generator status if it is an UNUSED commercial chemical product (i.e., P- or U-listed, or characteristic)
Laboratory management plan (LMP)	<ul style="list-style-type: none"> Not required 	<p>2-Part LMP required with 9 elements:</p> <ul style="list-style-type: none"> Contents of Part I are enforceable <ul style="list-style-type: none"> 2 elements in Part I Contents of Part II are NOT enforceable <ul style="list-style-type: none"> 7 elements in Part II

Appendix C: Lab Wastes Suitable for Discharge

Buffers	Ringers Solutions	Neutralizations	Other	Chemicals used in Cleaning Process
Cracking buffer	Mammalian Ringer's	Nitric acid neutralized with sodium carbonate	Stream table water with small amount of suspended silt and clay	Steris acid based descaler for maintenamce/cleaning of sterilizer
Citrate-phosphate	Insect Ringer's	Hydrochloric acid neutralized with potassium hydroxide or sodium hydroxide	Ground up rock material in water	Chamber Brite autoclave cleaner
Extraction buffer	Frog Ringer's	Sulfuric acid neutralized with potassium hydroxide or sodium hydroxide	Calgon solution	Minnicare Cleaner for flushing/cleaning of deionized water tanks
Phosphate buffered saline	Earthworm Ringer's	Sodium hydroxide neutralized with hydrochloric acid	Glycerol \leq 20% solution	Alcojet detergent for dishwasher used to clean animal cages
TES buffer	Drosophila Ringer's	Potassium hydroxide neutralized with hydrochloric acid	Ethanol \leq 5% solution	Neodisher Z and Dri-Contrad for laboratory labware dishwasher
Tris/NaCl buffer	Crayfish Ringer's		Glucose (sugar) solutions	Alconox detergent used to wash labware
Tris-glycine-SDS buffer	Modified Frog Ringer's		Tartrazine solution	
TBS buffer			Peep marshmallow solution	
TBE buffer			Orange G Dye solution	
TE buffer			Potassium iodide solution	
TAE buffer			Sodium thiosulfate solution	
SB buffer			Potassium bromate solution	
Mannitol assay medium			Hydrogen peroxide-phosphate buffered saline	
Grinding medium			20% normal goat serum in 0.1M phosphate buffered saline (PBS)	
Imidazole buffer			Goat anti rabbit biotinylated secondary antibody in 20% normal goat serum and 0.01M PBS	

Appendix C Continued: Lab Wastes Suitable for Discharge

Buffers	Ringers Solutions	Neutralizations	Other	Chemicals used in Cleaning Process
NADH solution/reaction buffer			Lysogeny broth	
Pyruvate solution			Nutrient broth	
Blocking buffer				
TBST buffer				
HEPES buffer				
Transfer buffer/towbin buffer				
0.01M phosphate buffered saline solution				
50X TAE electrophoresis buffer				
1X running buffer				
10X phosphate buffered saline				
Tris-buffered saline 10X stock solution				
1X tris-buffered saline, 0.1% Tween 20 detergent				
50mM phosphate buffer				
0.05M tris buffer				
Hydrion buffer				