



UNIVERSITY OF WYOMING

Laboratory Management Plan



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Laboratory Management Plan

I. INTRODUCTION

The University of Wyoming (UW) is committed to protecting the health and safety of students, employees, faculty, and volunteers at the various UW facilities. Therefore, it is UW's policy to implement a Laboratory Management Plan (LMP) compliant with the US Environmental Protection Agency (EPA) requirements found at 40 CFR Part 262, Subpart K – Alternative Requirements for Hazardous Waste Determination and Accumulation of Unwanted Material at Laboratories Owned by Colleges and Universities and Other Eligible Academic Entities Formally Affiliated with Colleges and Universities. This LMP is made available to laboratory personnel through the UW RMMC website and is also available upon request.

II. PURPOSE

The purpose of this Laboratory Management Plan is to comply with the provisions of 40 CFR Part 262 (Subpart K - Alternative Requirements for Hazardous Waste Determination and Accumulation of Unwanted Material for Laboratories Owned Eligible Academic Entities).

III. SCOPE

This LMP applies to laboratories on the UW Laramie Campus (1000 E. University Ave) while the remaining campus non-laboratory generators (for example, UW Operations, Campus Recreation, Housing and Dining, etc.) are required to follow the UW Hazardous Waste Program. Applicable laboratories include the following: teaching laboratories, research laboratories, chemical stockroom, visual arts and design studios, theatre studios and shops, and clinical teaching labs.

IV. IMPLEMENTATION

A. Responsibilities

1. University of Wyoming (UW)

UW is responsible for ensuring the safety of its personnel and compliance with applicable Federal, State, and Local regulations, standards, and codes. UW is also responsible to provide support and resources for the implementation of this program including equipment, training, and PPE.



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2. Regulated Materials Management Center (RMMC)

The RMMC is responsible for managing the review and characterization of laboratory waste; assisting with waste determinations, as well as the approval of laboratory waste disposal requests from the laboratory Principal Investigator or Supervisor; and completing the transfer of hazardous wastes from laboratory areas to the RMMC prior to final disposal.

3. Principal Investigator or Supervisors

The Principal Investigator (PI) or Supervisor for each laboratory or studio has overall responsibility for managing the process of characterizing laboratory waste; containerizing laboratory waste; marking/labeling laboratory waste; and managing waste in their laboratory spaces

4. UW Personnel

UW personnel who generate hazardous waste must follow the LMP and ensure that waste containers are correctly labeled with the contents and the accumulation start date. UW personnel must also complete required trainings.

B. Part 1

1. Element 1: Labeling Requirements

- a. Unwanted chemicals or waste will be labeled "Lab Waste".
- b. This label can be found and printed from http://www.uwyo.edu/safety/files/Docs/Forms/hazardous_waste_labels.pdf
- c. This label includes space for listing the chemicals in the waste container, their respective estimated percentages, accumulation start date, and generator information. The label must be affixed or attached to the lab waste container and be legible for emergency responders to discern the contents of the container.

2. Element 2: Pick Up Schedule

- a. Lab Waste must be removed from the lab by RMMC personnel within six (6) months of the accumulation start date identified on the waste container label. This time frame applies regardless of



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whether the container is full or not. UW has chosen to comply with 40 CFR Part 262.208(a)(2).

- b. If the waste container has been filled (with sufficient ullage for expansion or pouring, a request for disposal should be submitted to the RMMC for pick up in a timely manner or within six (6) months from the accumulation start date identified on the waste container, whichever comes first.
- c. If a lab accumulates more than 55 gallons of lab waste or one (1) quart of reactive acutely hazardous lab waste (maximum volumes exceeded), that waste must be removed within ten (10) calendar days of exceeding the above amounts. Additionally, the date the maximum volume is exceeded must be added to the container label.
- d. For lab waste pick-ups, use the "Hazardous and Radioactive Materials Request for Disposal Form" located at: <http://www.uwyo.edu/HazmatPickup> or email the RMMC's shared inbox, hazmat@uwyo.edu. Please allow at least a week for standard requests to complete the paperwork and schedule a pick-up time.

C. Part 2

1. Element 1: Best Practices for Container Labeling and Management
 - a. Containers shall be labeled "Lab Waste" immediately after used or waste product is added to the container for the first time.
 - b. Container labels found at: http://www.uwyo.edu/safety/_files/Docs/Forms/lab_waste_labels.pdf should be printed and every field completed by personnel adding waste into the container.
 - c. If there is not enough space on the label, add another label using the old label as a guide to complete the new label.
 - d. Labels must be affixed to its appropriate waste container or attached, if necessary.
 - e. Keep lab waste containers sealed except for when new materials are being added or there is a danger of building pressure inside the sealed vessel.
 - f. Keep lab waste containers in secondary containment. Secondary containment should be a sturdy vessel made of compatible material to the waste being stored in it, and capable of holding 110% of any waste being stored within it. Common secondary containments are plastic buckets or tubs.



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- g. Lab waste should be placed in a secondary container only with other compatible lab waste. Please find a list of non-compatible materials here:
<https://www.uwyo.edu/safety/files/Docs/Plans/chemicalhygieneplanlaboratorysafety.pdf> (on pages 28-30).

2. Element 2: Best Practices for Training for Laboratory Workers and Students

Laboratory personnel: faculty, staff, post-docs, graduate students, and undergraduate students in the laboratory workplace will be trained concerning harmful exposure to chemicals. The training will follow 29 CFR 1910.1450, Occupational Exposure to Hazardous Chemicals in Laboratories, and with respect to Workplace Chemical Safety, Hazard Communication (HazCom), GHS.

- a. Personnel associated with laboratories will attend this training at least once at the first available class after employment.
- b. Training will be documented with a hard copy of the records maintained in the UW Safety Office for five (5) years and electronically by Human Capital Management (HCM) system.
- c. The UW Safety Office will provide the Laboratory Safety training. This training will include:
 - i. The components; of UW's written Chemical Hygiene Program responsibilities.
 - ii. Air monitoring requirements.
 - iii. Rights to medical consultations and/or examinations.
 - iv. Hazard identification including methods and observations that may be used to detect the presence or release of a hazardous chemical.
 - v. The measures personnel can take to protect themselves from these hazards, including specific procedures UW has implemented to protect personnel from exposure to hazardous chemicals, such as appropriate work practices, emergency procedures, and personal protective equipment (PPE) to be used.
 - vi. An overview of the various safety policies relating to chemicals.
- d. A Laboratory Safety Refresher will be required every three (3) years and documented by hard copy and the HCM system. Laboratory personnel may attend the laboratory safety training for



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- UW Safety new employees or laboratory refresher training and online training. These classes are provided by UW Safety.
- e. Deans, Department Heads, Directors, and PI's are responsible for training personnel and volunteers in research laboratories under their supervision in the following areas, with hard copy documentation of the training:
 - i. Methods and observations that may be used to detect the presence or release of a hazardous chemical (for example, continuous monitoring devices, visual appearance or odor of hazardous chemicals).
 - ii. Physical and health hazards of the chemicals in the work area.
 - iii. Measures personnel can take to protect themselves from these hazards.
 - iv. Standard/safety operating procedures of the research laboratory.
 - v. Location of designated areas for particularly hazardous substances, including "select carcinogens," as specified in the Chemical Safety Guidelines.
 - f. Deans, Department Heads, Directors, PI's, and graduate teaching assistants are responsible for training students in teaching laboratories in the following areas, with hard copy documentation of the training:
 - i. Methods and observations that may be used to detect the presence or release of a hazardous chemical (for example, continuous monitoring devices, visual appearance or odor of hazardous chemicals).
 - ii. Physical and health hazards of the chemicals used in that class.
 - iii. Measures students must take to protect themselves from these hazards.
 - iv. Departmental laboratory standard operating policies.
 - v. The location of designated areas for particularly hazardous substances, including "select carcinogens," as specified in the Chemical Safety Guidelines.
 - g. Employee training records will be documented with employee signature or initials, date, instructor's name, training location, and an outline of the class.
 - h. Student training records will be documented by class outlines, which are to be maintained by the department.



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- 3. Element 3: Best Practices for Training for RMMC Employees (“Trained Professionals”)

The RMMC provides extensive training for RMMC personnel. Relevant standard operating procedures (and related exams) are:

New RMMC Employee Orientation
Identification of Regulated Materials
Waste Segregation
Hazardous Waste Classification and Pick-up
Universal Waste Pickup
Non-Regulated Waste Pick-up and Disposal
Waste Neutralization
Waste Bulking
Drum Cleaning
Facility Cleaning
Lab packing for disposal

Training records are retained in the RMMC Supervisor’s Office.

- 4. Element 4: Best Practices for Removing Lab Waste from Laboratories

Lab Waste must be removed from the lab by RMMC personnel within six (6) months of the accumulation start date identified on the waste container label. This time frame applies regardless of whether the container is full or not (40 CFR Part 262.208(a)(2). If a lab accumulates more than 55 gallons of lab waste or one (1) quart of reactive acutely hazardous lab waste (maximum volumes exceeded), that waste must be removed within ten (10) calendar days of exceeding the above amounts. Each lab is responsible for ensuring their waste does not exceed the maximum volumes allowed.

Removal from the RMMC occurs two (2) times per year so as not to exceed the maximum allowable volume or time limits for the University’s Generator Status. However, should a laboratory become close to an accumulation limit, they must notify the RMMC to ensure timely removal.

- 5. Element 5: Best Practices for Hazardous Waste Determinations

Hazardous waste determinations are made at the RMMC by trained RMMC personnel within four calendar (4) days of the waste arriving at this location. This follows the Resource Conservation and Recovery Act



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(RCRA) requirements applicable for small quantity generators. Each waste container is categorized, labeled with the appropriate Department of Transportation (DOT) and EPA codes, and stored until the waste vendor packs the waste for disposal.

6. Element 6: Best Practices for Laboratory Clean Outs

Laboratories are required to inventory their chemicals at least once per year as part of their laboratory safety plan. Chemicals that are unwanted or no longer needed should be removed from the laboratory and disposed of.

Each laboratory is eligible to conduct a laboratory cleanout one (1) time per 12-month period. In a laboratory clean-out conducted under Subpart K, however, a laboratory has 30 days from the starting date of the laboratory clean out to complete the laboratory clean-out without being required to remove the assembled unwanted materials from the laboratory, even if the laboratory exceeds 55 gallons of unwanted material (or 1 quart of reactive acutely hazardous unwanted material) (as opposed to ten (10) calendar days during a non-cleanout event).

Chemicals removed as part of an annual lab cleanout must be documented as such to include the laboratory location, the cleanout start date and end date, and the volume of hazardous waste generated during the cleanout. RMMC personnel maintain these records digitally and ensure these records are maintained for at least three (3) years from the date the clean out ends.

7. Element 7: Best Practices for Emergency Procedures

a. Chemical Spill Kit

Many spills are of limited hazard potential and can be safely managed by personnel in the vicinity. Areas storing hazardous chemicals must be equipped with a chemical spill kit appropriate to manage small, low-hazard spills.

The chemical spill kit should contain the following items:

- i. Absorbent material (vermiculite, absorbent pads, etc.)
- ii. Neutralizers for corrosives or toxics
- iii. Materials to limit the flow of a spill (absorbent sock/boom)
- iv. PPE (gloves, safety goggles)



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- v. Container/bags to collect the hazard spill contents
- vi. Hazard waste tag/label to identify the contents

b. Spill Response Procedure

Some spills may be more hazardous and personnel should not attempt cleanup. For these types of spills, evacuate the room and call the UW Safety Office (307-766-3227) if a spill situation involves any of the following:

- i. A respiratory hazard
- ii. A threat of fire or explosion
- iii. More than 100 mL of an OSHA regulated chemical carcinogen or a highly toxic chemical
- iv. More than one (1) liter of a volatile or flammable solvent
- v. More than one (1) liter of a corrosive (acid or base) liquid
- vi. Elemental (liquid) mercury spills

Chemical spill notifications should include the following information:

- i. Caller's name and phone number
- ii. Incident location
- iii. Location to meet the caller in the event that they have to evacuate the premises
- iv. Identity and quantity of the material spilled, if known, and any odors present
- v. Any injuries

In the event of a chemical spill, protection of personnel is the primary concern, then property protection. There may be little time to shut down procedures and secure activities and materials, so initial procedures should be to close containers and contain the spill if possible and initiate evacuation.

Step 1: Evacuate and Control Spill Area

Evacuate personnel from the immediate spill area.

Secure the immediate spill area – close corridor doors, use carts, chairs, wastebaskets, etc.

Eliminate fire hazards, especially if spill is flammable or combustible – shut down burners, electrical equipment, etc.

Post sign, "Spill Area – Keep Out".

Alert other personnel in adjacent areas of the spill.



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Step 2: Assist Injured Personnel

Take care of injured personnel – move from spill, remove contaminated clothing, flush skin with water, use eyewash and/or safety shower, etc. If there is a chemical splash to the eyes and/or there are burns or respiratory problems, seek medical attention immediately.

Step 3: Evaluate the Hazard(s)

Complete a preliminary evaluation of the hazard and identification of risks and decide whether you should call the Safety Office or Emergency Responders.

Step 4: Clean up Spill (if you can safely do so)

Don appropriate PPE.

Contain the spill using absorbent to stop spill from spreading under refrigerators, cabinets, equipment, drains, or corridors. Then spread absorbent around the perimeter, damming the spill. Absorb the rest of the liquid.

Scoop the absorbed chemical mixture into a plastic pail lined with a plastic bag.

Seal plastic bag and containerize for disposal.

Wash and deactivate the spill surfaces of trace amounts of the spilled chemical.

Contact the RMMC for disposal instructions.

Replace used materials in the chemical spill kit.

Step 5: Incident Review

Review incident to prevent further spills and improve response procedures.

c. High-Risk Chemical Concerns

Radioactive Chemicals: Refer to the UW Radioactive Materials Safety Plan for handling and emergency procedures.

The following need to be disposed of as radioactive waste. Gloves and radiation badges (if issued) must be worn when handling



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these items. If there is a major spill or evidence of dust or particulates in the air when handling these items, clear the area and prevent the spread of contamination. Immediately contact the PI, Radiation Safety Officer, RMMC Supervisor, or the HazMat Specialist:

Thorium compounds (Thorium metal, thorium nitrate, etc.)

Uranium compounds (Uranyl or Uranium acetate, Uranium nitrate, etc.)

Tritium (H-3) labeled compounds or waste

C-14 labeled compounds or waste

P-32, P-33, S-35, I-125 labeled compounds or waste.

Peroxide Formers: Peroxides may be explosive with movement or heating. These chemicals can be shock sensitive with age and/or evaporation. If a bottle is found cracked, open, or old, or if crystals are present, do not touch it and contact the RMMC Supervisor or HazMat Specialist immediately.

*Chemicals in **bold** require extreme caution.

*Chemicals in *italics* are common wastes at UW.

<p><i>2-Butanol</i> 2-Cyclohexen-1-ol <i>2-Hexanol</i> <i>2-Pentanol</i> 2-Phenylethanol 3-Methyl-1-butanol 4-Heptanol 4-Methyl-2-pentanol 4-Penten-1-ol Acetal <i>Acetaldehyde</i> Acrylic acid Acrylonitrile</p>	<p>Benzyl alcohol Butadiene Chloroprene Chlorotrifluoroethylene Cumene <i>Cyclohexanol</i> <i>Cyclohexene</i> Decahydronaphthalene Diacetylene Dicyclopentadiene Diethyl ether <i>(Diethylene glycol dimethyl ether)</i></p>	<p><i>Diglyme</i> <i>Dioxanes</i> Divinylacetylene <i>(Ethylene glycol dimethyl ether)</i> <i>Glyme</i> <i>Isopropyl alcohol</i> Isopropyl ether Methylisobutylketone Methyl methacrylate Methylacetylene Methylcyclopentane Styrene</p>	<p>Tetrafluoroethylene <i>Tetrahydrofuran</i> Tetrahydronaphthalene Vinyl acetate Vinyl ethers Vinylacetylene Vinyladiene chloride <i>Vinylchloride</i> Vinylidene chloride Vinylpyridine</p>
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Explosives: These chemicals may explode with movement or heating (If any of the following chemicals are requested for pickup or if you encounter them in any labs contact the RMMC Supervisor or the HazMat Specialist before you create manifests or attempt to move the container):



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Chemicals in bold have been found at UW in the past		
Acetylene	Guanyl nitrosamino	Pentolite
Acetylides	guanylidene	Perchlorates of heavy metals
Aluminum ophorite explosive	(Guanyl nitrosamino	Peroxides
Amatex	guanyltetrazene)	Picramic acid
Amatol	Guanylidene	Picric acid
Ammonal	Hexanite	Picryl chloride
Ammonium nitrate	Hexanitrodiphenylamine	Picryl fluoride
Ammonium perchlorate	Hexanitrostilbene	Picryl sulphonic acid
Ammonium picrate	Hexogen	Potassium
Ammonium salt lattice	Hydrazine	(Potassium
Azides of heavy metals	Hydrazinium nitrate	nitroaminotetrazole)
Baratol	Hydrazoic acid	Robenzoic acid
Butyl tetryl	Lead mannite	Silver acetylide
Calcium nitrate	Lead	Silver azide
Chlorate	mononitroresorcinate	Silver fulminate
Copper acetylide	Lead picrate	Silver styphnate
Cyanuric triazide	Lead styphnate	Silver tetrazene
Cyclotrimethylenetrinitramine	Magnesium ophorite	Sodatol
Dinitroethyleneurea	Mannitol hexantrate	Sodium amatol
Dinitroglycerine	Mercury fulminate	(Sodium dinitro-ortho-
Dinitrophenol	Mercury oxalate	cresolate)
Dinitrophenolates	Mercury tartrate	Sodium nitrate-
Dinitrophenyl hydrazine	Nitrated carbohydrate	potassium
Dinitrotoluene	Nitrated glucoside	Sodium picramate
Dipicryl sulfone	Nitroaminotetrazole	Syphnic acid
Dipicrylamine	Nitrogen trichloride	Tetranitrocarbozole
Ednatol	Nitrogen triiodide	Tetranitromethane
Erythritol tetranitrate	Nitroglycerin	Tetraze
Ethylene oxide	Nitroglycide	Tetrytol
Ethyl-tetryl	Nitroglycol	Tetrytolhydrazoic acid
Fulminating gold	Nitroguanidine	Trinitroanisole
Fulminating mercury	Nitronium perchlorate	Trinitrobenzene
Fulminating platinum	Nitroparaffins	Trinitronaphthalene
Fulminating silver	Nitrotoluene	Trinitrophenetol
Gelatinized nitrocellulose	Nitrourea	Trinitrophenol
Guanyl	Organic amine nitrates	Trinitrotoluene
	Organic nitramines	Tritonal
	Organic peroxides	Urea nitrate
	Ozonides	

Reactive Chemicals: For the safety of UW personnel and to ensure compliance with RCRA regulations, exercise care to identify reactive wastes. Although the process of using reactive chemicals in laboratory experiments usually eliminates the reactivity characteristic, some reactive chemicals can exhibit dangerous, residual properties. As an example, residual metallic



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sodium added to a solvent to remove water could result in a fire or explosion if that solvent is mixed with aqueous wastes. Label solutions containing sulfides and/or cyanides to alert personnel not to mix these with acid wastes. This mixing could release lethal amounts of toxic hydrogen sulfide (H₂S) and/or hydrogen cyanide (HCN) gas. Due to the hazards associated with shipping and disposing of reactive materials, make every effort to use or react the entire contents before disposing as hazard waste.

Mercury Spills: If your laboratory uses devices containing liquid elemental mercury, such as a thermometer, manometer, or sphygmomanometer, you must have a small mercury spill kit available to contain the spill. The kit should include mercury-absorbing sponges, amalgamating powder, mercury indicator powder, and containment bags. Liquid droplets of mercury travel quickly and can become lodged in tiny cracks and crevices. It is important to contain the spread before it can contaminate a larger area. If a mercury spill occurs, contact the Safety Office immediately after completing initial containment. Seal off the spill area so no one can walk on the spilled mercury.

d. Characterization of Unknown Chemicals

Laboratories, shops, and other chemical users are responsible for knowing the contents of the containers in their areas. If you have an unidentified chemical waste that you want to dispose of, attempt to identify the contents by asking other researchers. If the original researcher cannot be found, narrow the scope of potential generators. If you have exhausted all available information and still cannot identify a waste, the RMMC will inspect (and potentially analyze) a sample of the material.

V. PROGRAM REVIEW

This LMP will be reviewed and revised, as needed, to ensure the plan remains current with the waste management practices at UW and regulatory requirements.

VI. REFERENCES

40 CFR Part 262

Federal Register. Part II. Environmental Protection Agency. *40 CFR Parts 261 and 262 Standards Applicable to Generators of Hazardous Waste; Alternative Requirements for Hazardous Waste Determination and Accumulation of Unwanted Material at*



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Laboratories Owned by Colleges and Universities and Other Eligible Academic Entities Formally Affiliated With Colleges and Universities; Final Rule. Monday, December 1, 2008.

University of Wyoming RMMC Hazardous Waste Pick-Up Procedure.

University of Wyoming RMMC Identification of Regulated Materials.

University of Wyoming RMMC Small Spill Response.

University of Wyoming Chemical Hygiene Plan.



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APPENDIX A Definitions

Central Accumulation Area: means an on-site hazardous waste accumulation area subject to either § 262.34(a) (or 262.34(j) and (k) for Performance Track members) of this part (large quantity generators); or § 262.34(d)–(f) of this part (small quantity generators). A central accumulation area at an eligible academic entity that chooses to be subject to this subpart must also comply with § 262.211 when accumulating unwanted material and/or hazardous waste.

College/University: means 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.

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 cleanout 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 § 262.208 does not qualify as a laboratory clean-out.

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, post-doctoral 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.

Reactive Acutely Hazardous Unwanted Material: means an unwanted material that is one of the acutely hazardous commercial chemical products listed in § 261.33(e) for reactivity.

Trained Professional: means a person who has completed the applicable RCRA training requirements of § 265.16 for large quantity generators, or is knowledgeable about normal operations and emergencies in accordance with § 262.34(d)(5)(iii) for small quantity generators



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and conditionally exempt 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.

Unwanted Material: means any chemical, mixtures of chemicals, products of experiments or other material from a laboratory that is no longer needed, wanted or usable in the laboratory and that is destined for hazardous waste determination by a trained professional. Unwanted materials include reactive acutely hazardous unwanted materials and materials that may eventually be determined not to be solid waste pursuant to § 261.2, or a hazardous waste pursuant to § 261.3. If an eligible academic entity elects to use another equally effective term in lieu of “unwanted material,” as allowed by § 262.206(a)(1)(i), the equally effective term has the same meaning and is subject to the same requirements as “unwanted material” under this subpart.

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.