



LAWRENCE
LIVERMORE
NATIONAL
LABORATORY

LLNL-WEB-667261

EP1006-W *Waste Management Overview*

Version 2.0.0 / September 2016

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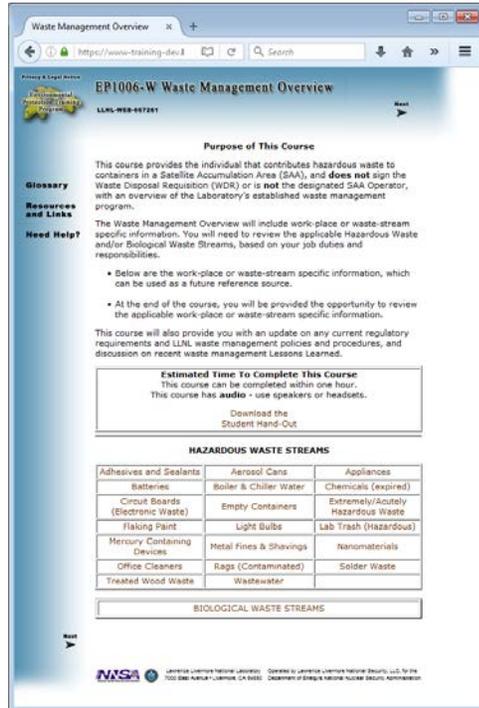
Auspices Statement

This work performed under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory under Contract DE-AC52-07NA27344.

EP1006-W Waste Management Overview

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This course provides the individual that contributes hazardous waste to containers in a Satellite Accumulation Area (SAA), and **does not** sign the Waste Disposal Requisition (WDR) or is **not** the designated SAA Operator, with an overview of the Laboratory's established waste management program.

The Waste Management Overview will include work-place or waste-stream specific information. You will need to review the applicable Hazardous Waste and/or Biological Waste Streams, based on your job duties and responsibilities.

- Below are the work-place or waste-stream specific information, which can be used as a future reference source.
- At the end of the course, you will be provided the opportunity to review the applicable work-place or waste-stream specific information.

This course will also provide you with an update on any current regulatory requirements and LLNL waste management policies and procedures, and discussion on recent waste management Lessons Learned.

HAZARDOUS WASTE STREAMS

Adhesives and Sealants	Aerosol Cans	Appliances
Batteries	Boiler & Chiller Water	Chemicals (expired)
Circuit Boards (Electronic Waste)	Empty Container	Extremely/Acutely Hazardous Waste
Flaking Paint	Light Bulbs	Lab Trash (Hazardous)
Mercury Containing Devices	Metal Fines & Shavings	Nanomaterials
Office Cleaners	Rags (Contaminated)	Solder Waste
Treated Wood Waste	Wastewater	

BIOLOGICAL WASTE STREAMS

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LLNL has established specific waste management systems to meet regulatory requirements, ensure the safety of human health, and protect the environment. These systems promote the safe management of all waste types generated at LLNL, including hazardous, radioactive, mixed, and biological wastes.

This course focuses on the generation of Hazardous Waste.

- If you generate Radioactive waste, you must take EP0006-COR *Regulated Waste Generation & Certification Core Training* and EP0006-RD *Radioactive Waste Generation & Certification Module*
- If you generate Biological waste, refer to PRO-2758 *Biological/Medical Waste Management*.
- You must also complete either HS4435 *Working Safely in a Biosafety Level 1 Laboratory* or HS4436 *Working Safely in a Biosafety Level 2 Laboratory* prior to generating biological waste.
- All medical waste treatment equipment operators must take course HS4686-W *Personal Protective Equipment* and HS4405-W *Blood and Bloodborne Pathogens*.
- If you treat Biohazardous, Pathology or Non-Red bag Biological (NRB) waste using an onsite Alameda county-permitted autoclave you must also take course EP0012-W *Medical Waste Treatment: Autoclave Operator Training*.
- If you treat Pathology Waste using the onsite Tissue Digester, you must also take course NA3004 *Tissue Digester Operators Training*.

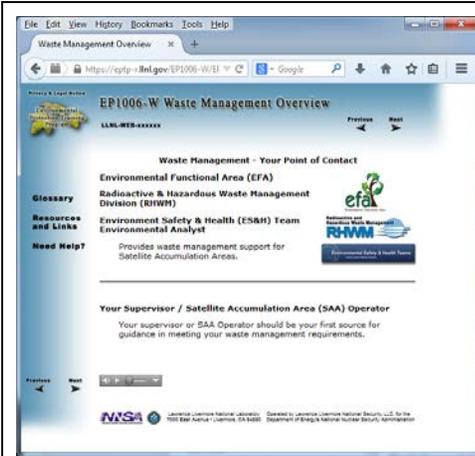
Reference Sources for more information about waste descriptions and waste management practices:

MyLLNL – Bookshelf: [Environmental Protection – Functional Area](#)

- [PRO-2756 Hazardous, Radioactive, Mixed Waste](#)
- [PRO-2757 Universal Waste Management](#)
- [PRO-2758 Biological Waste Management](#)
- [PRO-2759 Office and Shop Supplies Waste Management](#)

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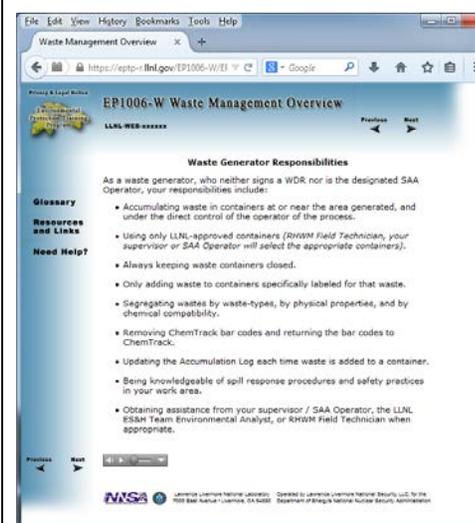


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The Environmental Functional Area (EFA), Radioactive and Hazardous Waste Management Division (RHWM), and Environment Safety and Health (ES&H) Team Environmental Analysts provide waste management support for Satellite Accumulation Areas or SAAs. The RHWM Technician works with waste generators to ensure that wastes are properly identified, sampled, packaged, and removed from the SAA. The Environmental Analyst, who serves on ES&H Teams, provides day-to-day guidance on compliance and waste management issues.

Your first-line supervisor, who may also be the designated SAA Operator, will ensure individuals (such as yourself) who contribute regulated waste to a container(s) in a SAA are trained in the details of how to manage the waste generated in your facility. Your supervisor or SAA Operator should be your first source for guidance in meeting your waste management requirements.

Your supervisor / SAA Operator will also keep current with their annual waste generator training requirements, and will coordinate with the RHWM Field Technician to have the waste transferred from the SAA to the Waste Accumulation Area (WAA).



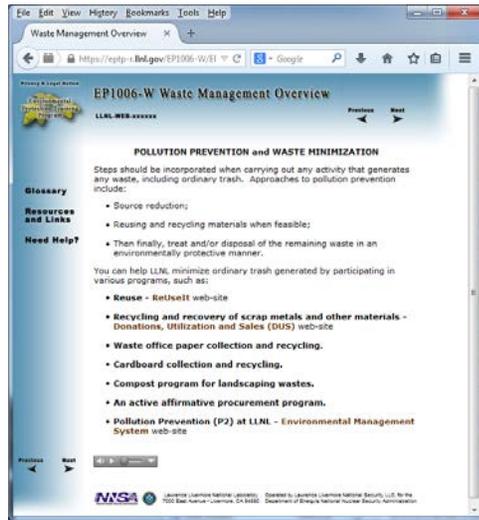
As a waste generator, who neither signs a WDR nor the designated SAA Operator, your responsibilities include:

- Ensuring that waste is accumulated in containers at or near the area where waste is generated, and that containers are under the direct control of the operator of the process generating the waste.
- Using LLNL-approved containers (with assistance from the RHWM Field Technician, your supervisor or SAA Operator will select the appropriate containers).
- Ensuring that the waste container is always kept closed.
- Ensuring that wastes are only added to containers specifically labeled for the waste stream.
- Ensuring that wastes are segregated by waste-types, by physical properties, and by chemical compatibility.
- Removing ChemTrack bar codes from containers prior to placing in the waste container, and returning the bar codes to ChemTrack.
- If there is an accumulation log, updating the log with the required information each time waste is added to a container.
- Having a fundamental knowledge of spill response procedures and safety practices in your work area.
- Obtaining assistance from your supervisor / SAA Operator, the LLNL ES&H Team Environmental Analyst, or RHWM Field Technician when appropriate.

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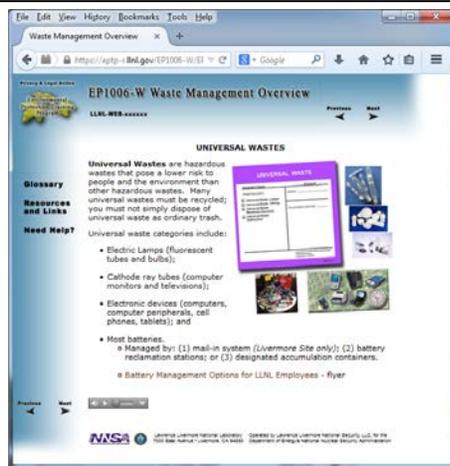


Pollution prevention and waste minimization steps should be incorporated when carrying out any activity that generates any waste, including ordinary trash. Approaches to pollution prevention include:

- Source reduction (the technique of substituting non-hazardous or less-hazardous material, optimizing processes, and using good operating practices);
- Reusing and recycling materials when feasible;
- Then finally, treat and/or disposal of the remaining waste in an environmentally protective manner.

You can help LLNL minimize ordinary trash generated by participating in various programs, such as:

- **Reuse.** For products and equipment that are no longer needed but still usable, LLNL has an online marketplace called ReUseIt.
- **Recycling and recovery of scrap metals and other materials.** LLNL's Donation, Utilization, and Sales (DUS) accepts, stores, and sells ferrous and nonferrous metals, precious metals, and reassigned equipment. Through the DUS, you can also recycle reconditioned toner cartridges for most printers.
- **Waste office paper collection and recycling.** This very successful effort uses the combined efforts of LLNL staff, the onsite janitorial service, and a recycling contractor to accumulate and collect this high-volume waste stream.
- **Cardboard collection and recycling. Compost program for landscaping wastes**
- **An active affirmative procurement program. "Pollution Prevention (P2) at Lawrence Livermore".** You can find information on pollution prevention, energy efficiency, waste minimization, sustainable design, and other environmental topics on the Environmental Management System website <https://ems.llnl.gov/>.



Universal wastes are hazardous wastes that pose a lower risk to people and the environment than other hazardous wastes. Many universal wastes must be recycled; you must not simply dispose of universal waste as ordinary trash. With the combined support from Facilities & Infrastructure, the Donation, Utilization and Sales (DUS) Group, and RHW, LLNL recycles or properly disposes of all Universal wastes.

Universal waste categories include:

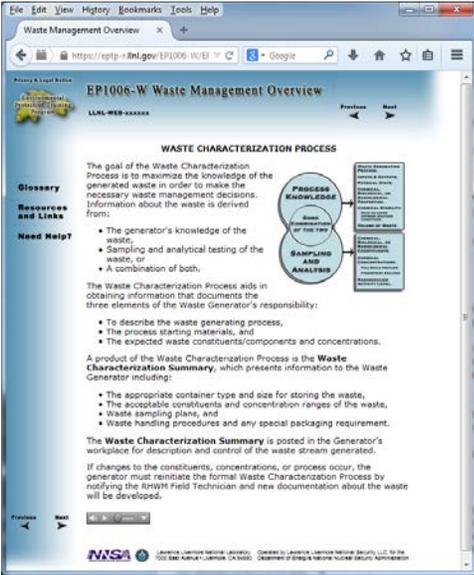
- Electric lamps (fluorescent tubes and bulbs)
- Cathode ray tubes (computer monitors and televisions)
- Electronic devices (e.g., computers, computer peripherals, cell phones, tablets); and
- Most batteries.

Batteries can be managed by one of three options – mail-in system, battery reclamation stations, or designated accumulation containers. The “mail-in system” only applies to small batteries generated at the Livermore Site; for Site 300, use the battery reclamation stations or accumulation containers. The FPOC, Building

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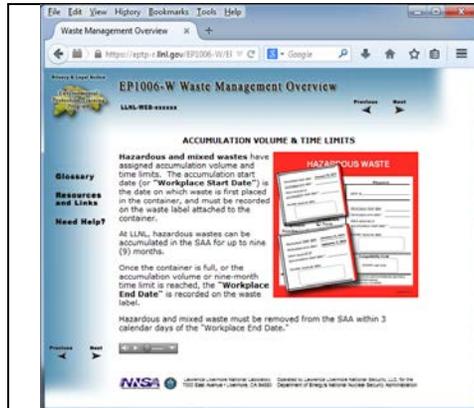
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	<p>Coordinator, or your RHWMTechnician can be contacted if you have any other universal waste items for recycling.</p>
	<p>All regulated waste must undergo a formal identification and evaluation process called Waste Characterization, and is conducted by RHWMTechnicians. Based on the information provided to the RHWMTechnicians, your waste streams will be evaluated to ensure its acceptability at the designated treatment or disposal facility.</p> <p>This includes information about your ‘process’ or experiment, the chemical, radioactive, or bio-hazardous materials involved in your experiment, the expected wastes being generated by your process, their physical properties, and the anticipated volume of waste. The characterization process will help to define the waste stream as a “hazardous waste” (e.g., ignitable, corrosive, reactive or toxic), a “radioactive waste” (e.g., radioactive material), mixed (both hazardous and radioactive), a “bio-hazardous waste” (e.g., infectious or communicable), or some combination.</p> <p>Once evaluated, a Waste Characterization Summary sheet(s) will be issued, and is the guiding and authorizing document for generating a regulated waste.</p> <p>Please remember – if changes are going to be made to the processes, constituents, or concentrations, you need to get in contact with your supervisor or SAA Operator before implementing the changes; they will contact the RHWMTechnician to have the waste re-characterized or re-evaluated. This process ensures that the treatment or disposal facility can continue to accept your waste.</p> <p>Should the waste stream not be acceptable, your experiment may have to be temporarily restricted until RHWMTechnician can make arrangements for the waste’s proper treatment and disposal at another facility or obtain approval from DOE for the experiment to continue.</p>
	<p>The SAA is an area where small quantities of wastes are temporarily accumulated at or near the initial point of generation. The term “waste” encompasses anything that is unusable or intended to be discarded, discharged, or abandoned. A “regulated waste” is a waste with properties that make it dangerous or capable of having a harmful effect on human health or the environment.</p> <p>The accumulation of waste at the SAA must be under the direct control of the individual generating the waste, specifically in the same or adjacent room or work area. If the waste generator cannot observe the container at all times, steps must be taken to prevent additions of unidentified wastes. Locking the container or locking the area where the container is stored is recommended.</p> <p>Each container will have its corresponding Waste Characterization Summary posted nearby for the description and additional control of each approved waste stream.</p>

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Hazardous and mixed wastes have assigned accumulation volume and time limits. The accumulation start date (or “Workplace Start Date”) is the date on which waste is first placed in the container, and must be recorded on the waste label attached to the container.

At LLNL, hazardous waste can be accumulated in the SAA for up to nine (9) months. Once the container is full, or the accumulation volume or nine-month time limit is reached, the “Workplace End Date” is recorded on the waste label. Hazardous and mixed waste must be removed from the SAA within 3 calendar days of the “Workplace End Date.”

To facilitate a timely transition from SAA, you need to notify your supervisor or SAA Operator at least one week in advance of the “Workplace End Date” so arrangements can be made with the RHWM Field Technician to transfer the container from the SAA to the Waste Accumulation Area (or ‘WAA’).



Radioactive waste is not subject to the hazardous waste management accumulation time or quantity limits.

However, to ensure proper management, many of the administrative requirements applicable to hazardous waste are used to manage radioactive waste.

A radioactive waste label must be applied to the container when waste is first added, and the "Workplace Start Date" must be recorded.

If you generate Radioactive waste, you must complete courses EP0006-COR *Regulated Waste Generation & Certification Core Training* and EP0006-RAD *Radioactive Waste Generation & Certification Module*.



Medical Waste is regulated by the California Medical Waste Management Act (MWMA), and includes the following:

- Biohazardous Waste
- Pathology Waste
- Pharmaceutical Waste
- Sharps Waste
- Trace Chemotherapeutic Waste
- Trauma Scene Waste (rarely generated at LLNL)
- Non-Red bag Biological (NRB) Waste

Click here to download the
BIOLOGICAL WASTE OVERVIEW

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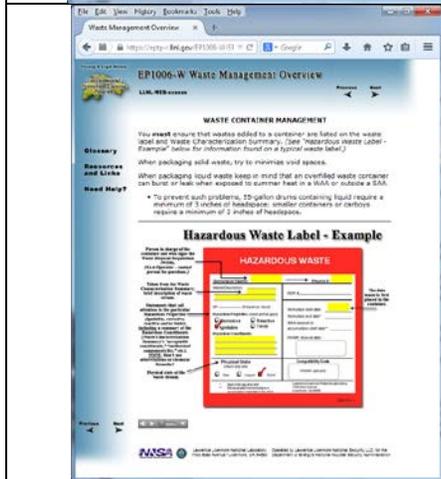


Waste containers are to remain closed at all times, except when adding or removing waste.

After adding wastes by funnel, those funnel without a tight fitting lid must be removed from the container and the lid tightly affixed on the container. After removing the funnel, place it in a labeled beaker or other container compatible with the waste.

Funnels with tight-fitting lids and can be attached to the drum's bung opening do not need to be removed.

Likewise, solid waste containers fitted with a latching drum lid can provide easy access and security, while eliminating the need to replace the lid, drum ring, and bolt after each use.



You must ensure that wastes added to a container that represent a hazard are listed on the waste label and the Waste Characterization Summary. When packaging solid waste, try to minimize void spaces. When packaging liquid waste keep in mind that an overfilled waste container can burst or leak when exposed to summer heat in a WAA or outside a SAA. To prevent such problems, 55-gallon drums containing liquid require a minimum of 3 inches of headspace; smaller containers or carboys require a minimum of 2 inches of headspace.

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You must segregate wastes in the SAA into separate containers according to the chemical compatibility (e.g., acid, caustic, organic, or oxidizers) and physical state (e.g., liquid or solid) of the materials involved.

Segregation is required because some chemicals may be highly reactive if mixed with others. Improper mixtures may also require costly special analyses and disposal procedures.

All waste types (for example, medical waste, radioactive waste, hazardous waste, mixed waste, non-hazardous waste, etc) must be packaged separately. You should also segregate trash cans from regulated waste containers to preclude inadvertent mixing or emptying of regulated waste containers by custodians.

You must **pause work** if you are unsure about the contents of a container or if you have any doubts before adding your waste. Contact your Supervisor/SAA Operator or RHWM Tech to help identify the contents.

WASTE CONTAINER MANAGEMENT - LESSONS LEARNED!

In April 2014, an acidic chemical reaction occurred at a DOE Facility. Earlier in the day, Chemical Etch/Cleaning Process Operators emptied a two (2) liter nitric acid waste solution into a designated, properly labeled and compatible waste container - a normal step in the Chemical Etch/Cleaning Process operation. The waste container held a small volume of waste prior to the addition of the nitric acid waste. The Operator closed the waste container, placed the closed container in the acidic waste chemical storage cabinet and closed the cabinet.

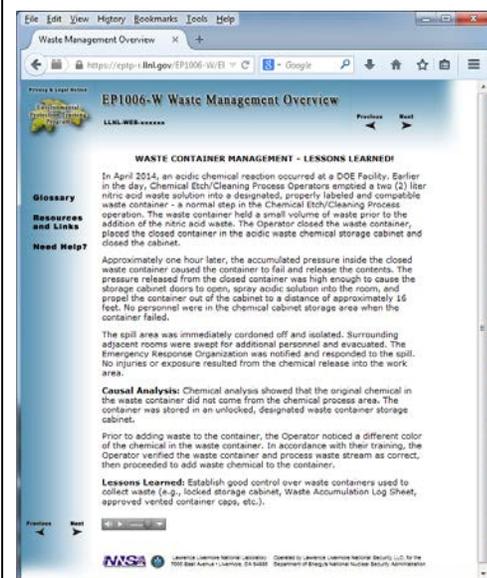
Approximately one hour later, the accumulated pressure inside the closed waste container caused the container to fail and release the contents. The pressure released from the closed container was high enough to cause the storage cabinet doors to open, spray acidic solution into the room, and propel the container out of the cabinet to a distance of approximately 16 feet. No personnel were in the chemical cabinet storage area when the container failed.

The spill area was immediately cordoned off and isolated. Surrounding adjacent rooms were swept for additional personnel and evacuated. The Emergency Response Organization was notified and responded to the spill. No injuries or exposure resulted from the chemical release into the work area.

Causal Analysis: Chemical analysis showed that the original chemical in the waste container did not come from the chemical process area. The container was stored in an unlocked, designated waste container storage cabinet.

Prior to adding waste to the container, the Operator noticed a different color of the chemical in the waste container. In accordance with their training, the Operator verified the waste container and process waste stream as correct, then proceeded to add waste chemical to the container.

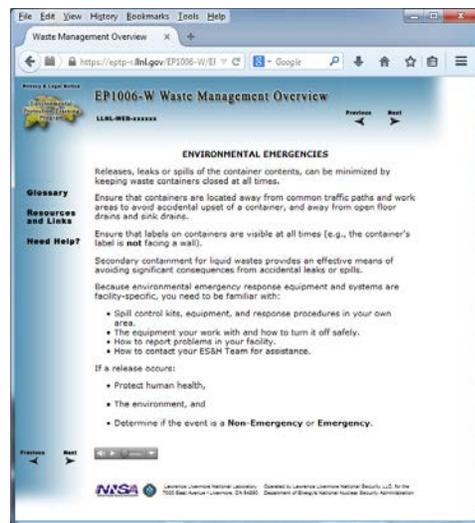
Lessons Learned: Establish good control over waste containers used to collect waste (e.g., locked storage cabinet, Waste Accumulation Log Sheet, approved vented container caps, etc.).



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Releases, leaks or spills of the container contents, can be minimized by keeping waste containers closed at all times. Ensure that containers are located away from common traffic paths and work areas to avoid accidental upset of a container, and away from open floor drains and sink drains.

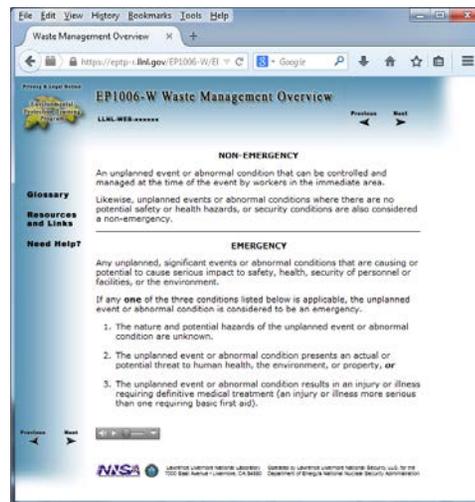
Ensure that labels on containers are visible (e.g., the container's label is not facing a wall).

Secondary containment for liquid wastes provides an effective means of avoiding significant consequences from accidental leaks or spills.

Because environmental emergency response equipment and systems are facility-specific, you need to:

- Be familiar with the spill control kits, equipment, and response procedures in your own area.
- Be familiar with the equipment your work with and how to turn it off safely.
- Know how to report potential problems in your facility.
- Know how to contact your ES&H Team for assistance.

If a release occurs, the primary objectives of the response are to protect human health, the environment, and determining if the event is either a Non-Emergency or Emergency.



A Non-Emergency is:

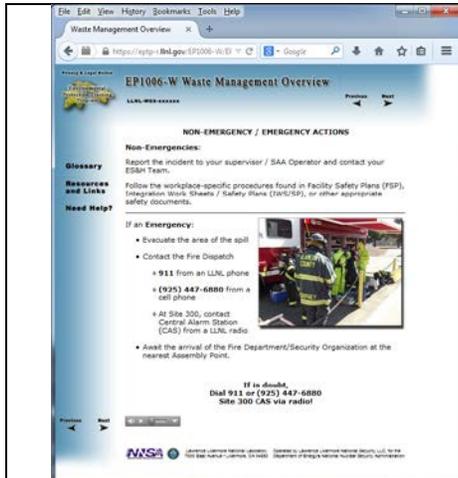
- An unplanned event or abnormal condition that can be controlled and managed at the time of the event by workers in the immediate area.
- Likewise, unplanned events or abnormal conditions where there are no potential safety or health hazards or security conditions are also considered a non-emergency.

Emergencies are defined as unplanned, significant events or abnormal conditions that are causing or have the potential to cause serious impact to the safety, health, or security of personnel, facilities, or the environment; or it is unsafe to handle without aid from professional emergency responders (Fire Department and/or Security). If any one of the three conditions listed below is applicable, the unplanned event or abnormal condition is considered to be an emergency.

1. The nature and potential hazards of the unplanned event or abnormal condition are unknown.
2. The unplanned event or abnormal condition presents an actual or potential threat to human health, the environment, or property, *or*
3. The unplanned event or abnormal condition results in an injury or illness requiring definitive medical treatment (an injury or illness more serious than one requiring basic first aid).

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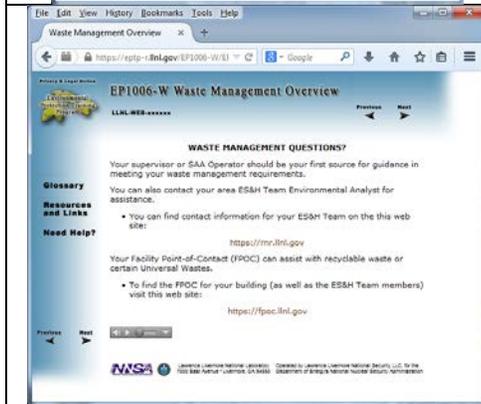
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For a Non-Emergency, you must report the incident to your supervisor / SAA Operator, and contact your ES&H Team. The ES&H Team Environmental Analyst will follow the regulatory requirements for reporting the incident when necessary. With assistance from the ES&H Team, trained personnel in the immediate area can handle most Non-Emergencies, following the workplace-specific procedures found in Facility Safety Plans (FSP), Integration Work Sheets / Safety Plans (IWS/SP), or other appropriate safety documents.

If an Emergency, you should evacuate the area of the spill and immediately contact the Fire Dispatch at 911 from an LLNL phone or (925) 447-6880 from a cell phone. For emergencies at Site 300, dial 911 from a LLNL phone or contact the Central Alarm Station (CAS) using a LLNL radio.

Await the arrival of the Fire Department and Security Organization at the Assembly Point to provide information regarding the emergency.

When in doubt if the unplanned event or abnormal condition is an emergency or non-emergency, dial 911 from a Laboratory phone, (925) 447-6880 from a cell phone or contact CAS from a LLNL radio.

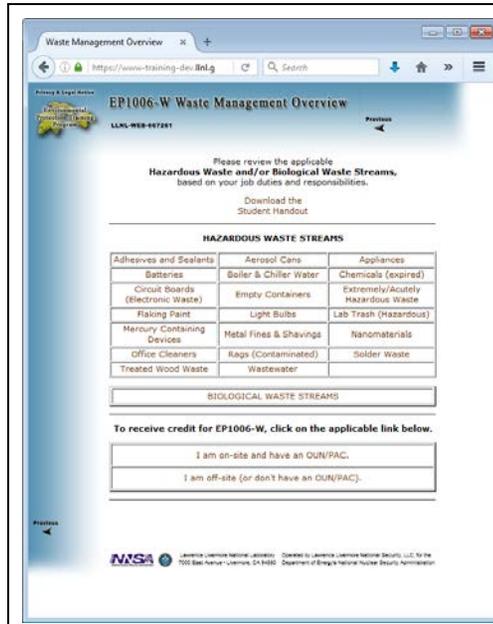


To get help with ES&H concerns, such as waste management questions:

- Your supervisor or SAA Operator should be your first source for guidance in meeting your waste management requirements.
- You can also contact your area ES&H Team Environmental Analyst for assistance on the web site shown.
- Your Facility Point-of-Contact (FPOC) can assist with recyclable waste or certain Universal Wastes.
- To find the FPOC for your building – as well as the ES&H Team members – visit the web site shown.

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Please review the applicable
Hazardous Waste and/or Biological Waste Streams,
based on your job duties and responsibilities.

HAZARDOUS WASTE STREAMS

Adhesives and Sealants	Aerosol Cans	Appliances
Batteries	Boiler & Chiller Water	Chemicals (expired)
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Flaking Paint	Light Bulbs	Lab Trash (Hazardous)
Mercury Containing Devices	Metal Fines & Shavings	Nanomaterials
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BIOLOGICAL WASTE STREAMS

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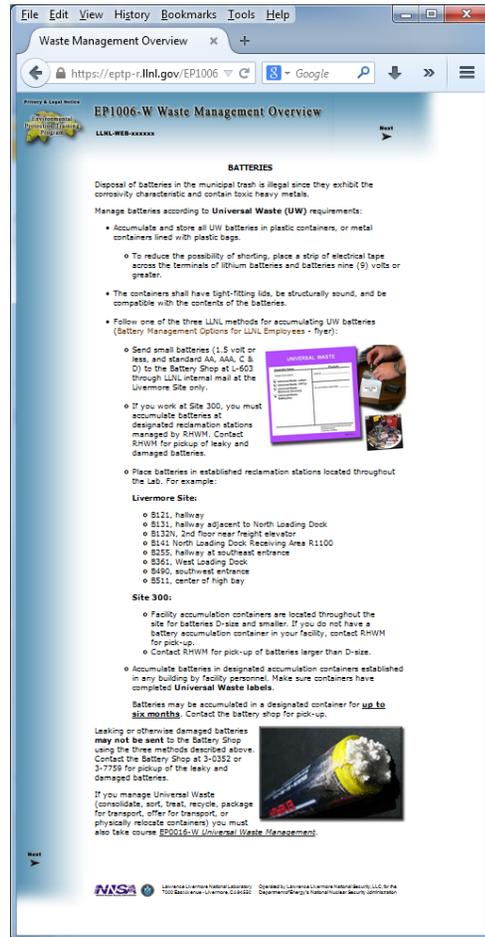
Waste-Stream Specific Information – HAZARDOUS WASTE STREAMS

	<h3 style="text-align: center;">ADHESIVES AND SEALANTS</h3> <p>Many adhesives and sealants contain solvents and other toxic chemicals, and must be managed as hazardous waste. If the spent adhesive is dry (i.e., cured) and does not contain regulated metals, it can be managed as nonhazardous waste and thrown in the trash.</p> <p>If the adhesive is uncured, you must manage it as a hazardous waste.</p> <ul style="list-style-type: none"> • Accumulate uncured or waste adhesive in a satellite accumulation container with a completed hazardous waste label. • Make sure the label reflects hazardous properties of the material and any other chemical residue, as well as the date the container began accumulating (accumulation start date). • Contact RHW for pick-up within 9 months of the accumulation start date. <p>Review the Safety Data Sheet (SDS) for the product information and/or contact your RHW Technician, ES&H Team Environmental Analyst or SAA Operator for further guidance or waste characterization.</p>
	<h3 style="text-align: center;">AEROSOL CANS</h3> <p>If the aerosol can that you need to dispose of is not empty (contains product residue or propellant)...</p> <ul style="list-style-type: none"> • Characterize the container according to the hazardous waste characteristics inherent in the product or propellant. • Contact your ES&H Team Environmental Analyst for guidance in properly characterizing the waste. • Contact your RHW Field Tech for disposal. <p><u>Note:</u> An aerosol container is not considered hazardous due to the pressurized state of the container.</p> <p>If the empty aerosol container meets the following criteria, then manage the container as nonhazardous waste.</p> <ul style="list-style-type: none"> • The container does not contain an extremely or acutely hazardous material. (Contact the ES&H Team Environmental Analyst or RHW Field Technician). • The spray mechanism is not defective, and the contents and propellant were discharged to the maximum extent practical under normal use.
	<h3 style="text-align: center;">APPLIANCES</h3> <p>Many appliances contain hazardous materials and must follow certain management standards for recycling and/or disposal. Items from an area where there is a potential for hazardous, radioactive or explosives contamination must be evaluated by the ES&H Team prior to movement to Donation, Utilization and Sales Group (DUS). Major appliances include but are not limited to, a washer dryer, refrigerator, freezer, water heater, space heater, furnace, boiler, air conditioner, oven, stove, or microwave.</p> <ul style="list-style-type: none"> • Contact your ES&H Team H&S Tech or Environmental Analyst to begin the paperwork and management through Donation, Utilization, and Sales Group (DUS).

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BATTERIES

Disposal of batteries in the municipal trash is illegal since they exhibit the corrosivity characteristic and contain toxic heavy metals.

Manage batteries according to **Universal Waste (UW)** requirements:

- Accumulate and store all UW batteries in plastic containers, or metal containers lined with plastic bags.
 - To reduce the possibility of shorting, place a strip of electrical tape across the terminals of lithium batteries and batteries nine (9) volts or greater.
- The containers shall have tight-fitting lids, be structurally sound, and be compatible with the contents of the batteries.
- Follow one of the three LLNL methods for accumulating UW batteries ([Battery Management Options for LLNL Employees](#) - flyer):
 - Send small batteries ((1.5 volt or less - standard AA, AAA, C, & D) to the Battery Shop at L-603 through LLNL internal mail at the Livermore Site only.
 - If you work at Site 300, you must accumulate batteries at designated reclamation stations managed by RHW. Contact RHW for pickup of leaky and damaged batteries.
 - Place batteries in established reclamation stations located throughout the Lab. For example:

Livermore Site:

- B121, hallway
- B131, hallway adjacent to North Loading Dock
- B132N, 2nd floor near freight elevator
- B141 North Loading Dock Receiving Area R1100
- B255, hallway at southeast entrance
- B361, West Loading Dock
- B490, southwest entrance
- B511, center of high bay
- B255, hallway at southeast entrance
- B361, West Loading Dock
- B490, southwest entrance
- B511, center of high bay

Site 300:

- Facility accumulation containers are located throughout the site for batteries D-size and smaller. If you do not have a battery accumulation container in your facility, contact RHW for pick-up
- Contact RHW for pick-up of batteries larger than D-size
- Accumulate batteries in designated accumulation containers established in any building by facility personnel. Make sure containers have completed **Universal Waste labels**.

Batteries may be accumulated in a designated container for **up to six months**. Contact the battery shop for pick-up.

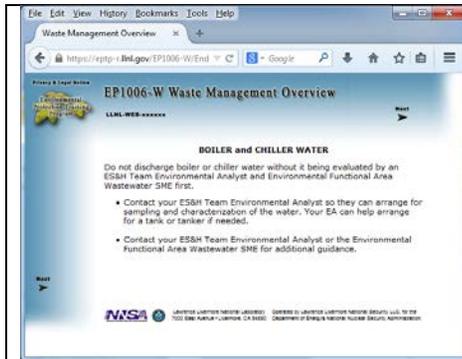
Leaking or otherwise damaged batteries **may not be sent** to the Battery Shop using the three methods described above. Contact the Battery Shop at 3-0352 or 3-7759 for pickup of the leaky and damaged batteries.

If you manage Universal Waste (consolidate, sort, treat, recycle, package for transport, offer for transport, or physically relocate containers) you must also take course [EP0016-W Universal Waste Management](#).

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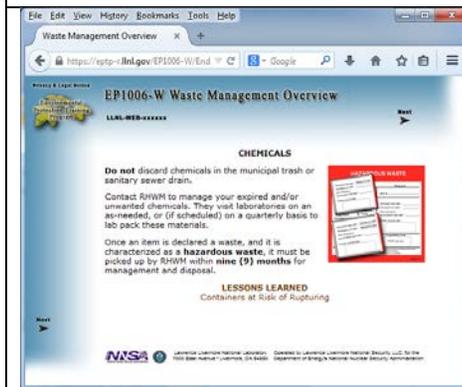
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BOILER and CHILLER WATER

Do not discharge boiler or chiller water without it being evaluated by an ES&H Team Environmental Analyst and Environmental Functional Area Wastewater SME first.

- Contact your ES&H Team Environmental Analyst so they can arrange for sampling and characterization of the water. Your EA can help arrange for a tank or tanker if needed.
- Contact your ES&H Team Environmental Analyst or the Environmental Functional Area Wastewater SME for additional guidance.



CHEMICALS

Do not discard chemicals in the municipal trash or sanitary sewer drain.

Contact RHWM to manage your expired and/or unwanted chemicals. They visit laboratories on an as-needed, or (if scheduled) on a quarterly basis to lab pack these materials.

Once an item is declared a waste, and it is characterized as a **hazardous waste**, it must be picked up by RHWM within **nine (9) months** for management and disposal.

LESSONS LEARNED

Containers at Risk of Rupturing



CIRCUIT BOARDS (E-Waste)

Loose printed circuit boards generated by maintenance, repair activities, or fabrication activities that are not needed should be collected for recycling.

Upon removal of a loose printed circuit board from equipment, arrangements must be made to send them to DUS. DUS will ensure that they are properly placed in containers with lids, and labeled as “residual printed circuit boards”.

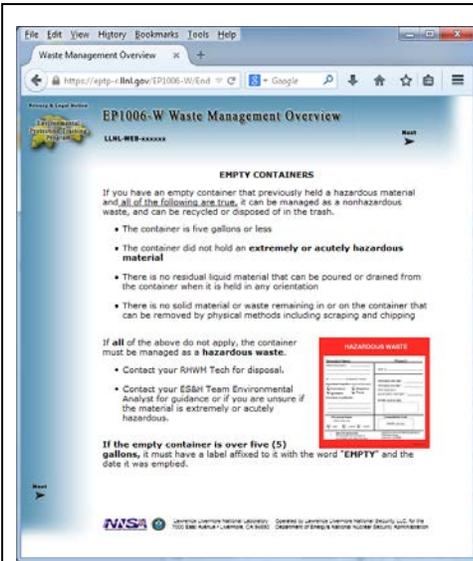
Contact the Donation, Utilization, and Sales Group (DUS). Call ext. 3-1546.

If your area plans on generating large quantities of circuit boards, contact your ES&H Team EA for guidance on properly collecting them in your work area.

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EMPTY CONTAINERS

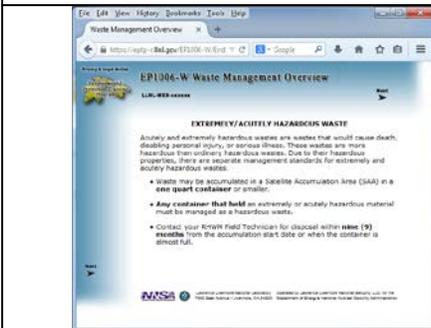
If you have an empty container that previously held a hazardous material and all of the following are true, it can be managed as a nonhazardous waste, and can be recycled or disposed of in the trash.

- The container is five gallons or less
- The container did not hold an **extremely or acutely hazardous material**
- There is no residual liquid material that can be poured or drained from the container when it is held in any orientation
- There is no solid material or waste remaining in or on the container that can be removed by physical methods including scraping and chipping.

If **all** of the above do not apply, the container must be managed as a **hazardous waste**.

- Contact your RHW Tech for disposal.
- Contact your ES&H Team Environmental Analyst for guidance or if you are unsure if the material is extremely or acutely hazardous.

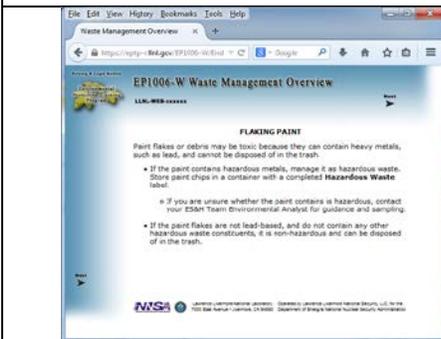
If the empty container is over five gallons, it must have label affixed to it with the word “EMPTY” and the date it was emptied.



EXTREMELY/ACUTELY HAZARDOUS WASTE

Acutely and extremely hazardous wastes are wastes that would cause death, disabling personal injury, or serious illness. These wastes are more hazardous than ordinary hazardous wastes. Due to their hazardous properties, there are separate management standards for extremely and acutely hazardous wastes.

- Waste may be accumulated in a Satellite Accumulation Area (SAA) in a **one quart container** or smaller.
- **Any container that held** an extremely or acutely hazardous material must be managed as a hazardous waste.
- Contact your RHW Field Technician for disposal within **nine (9) months** from the accumulation start date or when the container is almost full.



FLAKING PAINT

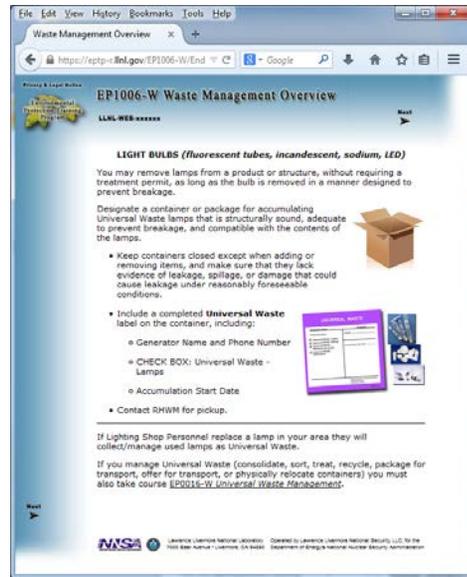
Paint flakes or debris may be toxic because they can contain heavy metals, such as lead, and cannot be disposed of in the trash.

- If the paint contains hazardous metals, manage it as hazardous waste. Store paint chips in a container with a completed **Hazardous Waste** label.
 - If you are unsure whether the paint is hazardous, contact your ES&H Team Environmental Analyst for guidance and sampling.
- If the paint flakes are not lead-based, and do not contain any other hazardous waste constituents, it is non-hazardous and can be disposed of in the trash.

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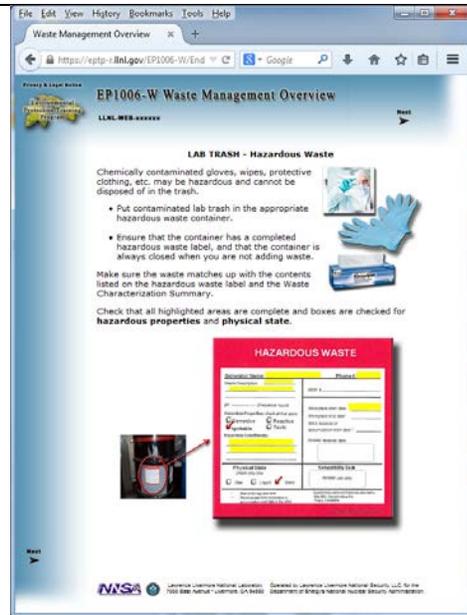
LIGHT BULBS (*fluorescent tubes, incandescent, sodium, LED*)

You may remove lamps from a product or structure, without requiring a treatment permit, as long as the bulb is removed in a manner designed to prevent breakage.

Designate a container or package for accumulating Universal Waste lamps that is structurally sound, adequate to prevent breakage, and compatible with the contents of the lamps.

- Keep containers closed except when adding or removing items, and make sure that they lack evidence of leakage, spillage, or damage that could cause leakage under reasonably foreseeable conditions.
- Include a completed **Universal Waste** label on the container, including:
 - Generator Name and Phone Number
 - CHECK BOX: Universal Waste - Lamps
 - Accumulation Start Date
- Contact RHWM for pickup.

If Lighting Shop Personnel replace a lamp in your area they will collect/manage used lamps as Universal Waste. If you manage Universal Waste (consolidate, sort, treat, recycle, package for transport, offer for transport, or physically relocate containers) you must also take course [EP0016-W Universal Waste Management](#).



LAB TRASH – Hazardous Waste

Chemically contaminated gloves, wipes, protective clothing, etc. may be hazardous and cannot be disposed of in the trash. (This also applies to hazardous residual such as metal fines or finely divided metal grindings)

- Put contaminated lab trash in the appropriate hazardous waste container.
- Ensure that the container has a completed hazardous waste label, and that the container is always closed when you are not adding waste.

Make sure the waste matches up with the contents listed on the hazardous waste label and the Waste Characterization Summary.

(Image of Waste Label) Check that all highlighted areas are complete and boxes are checked for **hazardous properties and physical state**.

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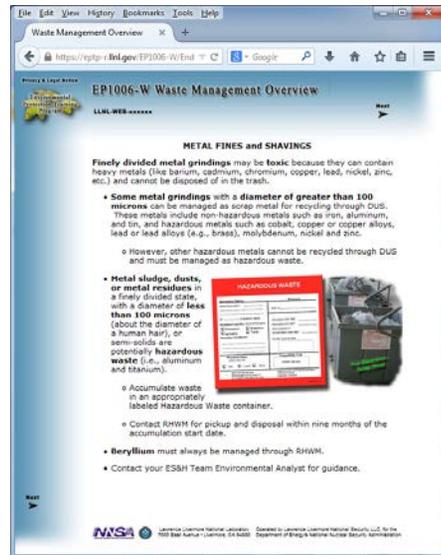


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MERCURY CONTAINING DEVICES

Mercury containing devices have hazardous constituents and must be managed as **Hazardous Waste**.

- Contact your ES&H team immediately if a mercury containing device is broken. **Do not** attempt to handle the broken mercury containing devices without assistance from your ES&H team.
- Contact your RHWM Field Tech for disposal of intact mercury containing devices that are no longer needed.
- Designate a container or package that is structurally sound and adequate to prevent breakage of the mercury containing device(s) until they are picked up by RHWM.



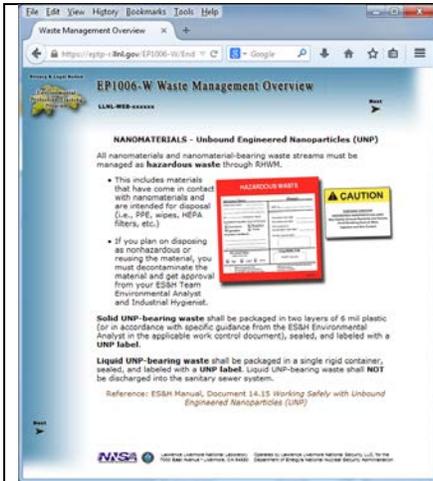
METAL FINES and SHAVINGS

Finely divided metal grindings may be **toxic** because they can contain heavy metals (like barium, cadmium, chromium, copper, lead, nickel, zinc, etc.) and cannot be disposed of in the trash.

- **Some metal grindings** with a diameter of **greater than 100 microns** can be managed as scrap metal for recycling through DUS. These metals include non-hazardous metals such as iron, aluminum, and tin, and hazardous metals such as cobalt, copper or copper alloys, lead or lead alloys (e.g., brass), molybdenum, nickel and zinc.
 - However, other **hazardous metals cannot be recycled** through DUS and must be managed as hazardous waste.
- **Metal sludge, dusts, or metal residues** in a finely divided state, with a diameter of **less than 100 microns** (about the diameter of a human hair), or semi-solids are potentially **hazardous waste** (i.e., aluminum and titanium).
 - Accumulate waste in an appropriately labeled Hazardous Waste container.
 - Contact RHWM for pickup and disposal within nine months of the accumulation start date.
- **Beryllium** must always be managed through RHWM.
- Contact your ES&H Team Environmental Analyst for guidance.

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NANOMATERIALS – Unbound Engineered Nanoparticles (UNP)

All nanomaterials and nanomaterial-bearing waste streams must be managed as **hazardous waste** through RHW.

- This includes materials that have come in contact with nanomaterials and are intended for disposal (i.e., PPE, wipes, HEPA filters, etc.)
- If you plan on disposing as nonhazardous or reusing the material, you must decontaminate the material and get approval from your ES&H Team Environmental Analyst and Industrial Hygienist.

Solid UNP-bearing waste shall be packaged in two layers of 6 mil plastic (or in accordance with specific guidance from the ES&H Environmental Analyst in the applicable work control document), sealed, and labeled with a **UNP label**.

Liquid UNP-bearing waste shall be packaged in a single rigid container, sealed, and labeled with a **UNP label**.

Liquids UNP-bearing waste shall **NOT** be discharged into the sanitary sewer.

[Reference: ES&H Manual, Document 14.15 Working Safely with Unbound Engineered Nanoparticles \(UNP\)](#)



OFFICE CLEANERS

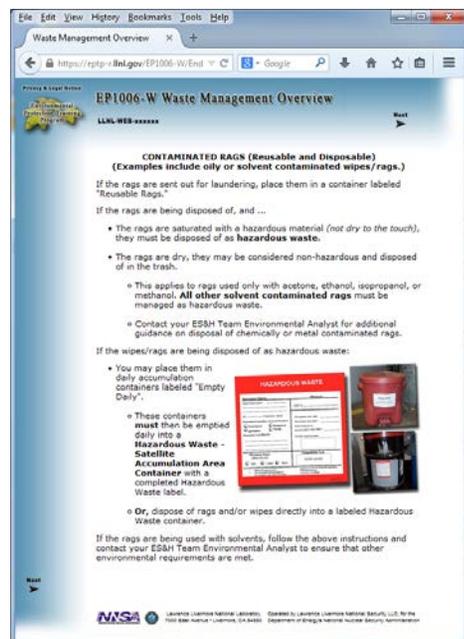
If you have office cleaning supplies that contain hazardous materials and are no longer being used or are expired, contact RHW so they can arrange for pickup and disposal.

[LESSONS LEARNED
Containers at Risk of Rupturing](#)

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CONTAMINATED RAGS (Reusable and Disposable)

Examples include oily or solvent contaminated wipes/rags

If the rags are sent out for laundering, place them in a container labeled "Reusable Rags."

If the rags are being disposed of and...

- the rags are saturated with a hazardous material (*not dry to the touch*), they must be disposed of as **hazardous waste**.
- the rags are dry, they may be considered non-hazardous and disposed of in the trash
 - This applies to rags used only with acetone, ethanol, isopropanol, or methanol. All other solvent contaminated rags must be managed as hazardous waste.
 - Contact your ES&H Team Environmental Analyst for additional guidance on disposal of chemically or metal contaminated rags.

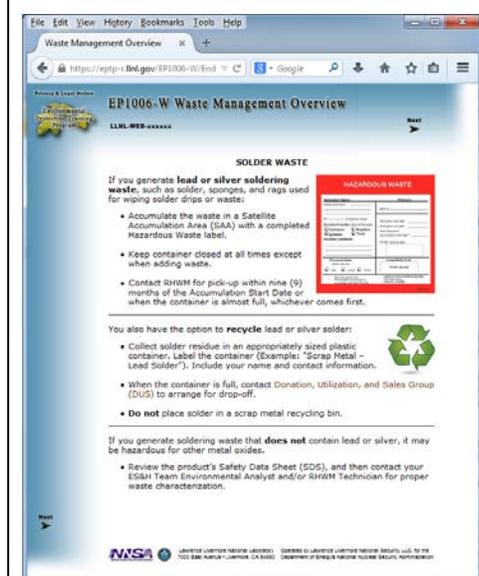
If the rags/wipes are being disposed of as hazardous waste:

- You may place them in **daily accumulation containers** labeled with a complete hazardous waste label and the words "Empty Daily" written in place of the accumulation start date.
 - These containers **must** then be emptied daily into a **Hazardous Waste - Satellite Accumulation Area Container** with a completed Hazardous Waste label.
- **Or**, dispose of rags and/or wipes directly into a labeled Hazardous Waste container.

If the rags are being used with solvents, follow the above instructions and contact your ES&H Team Environmental Analyst to ensure that other environmental requirements are met.

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SOLDER WASTE

If you generate **lead or silver soldering waste**, such as solder, sponges, and rags used for wiping solder drips or waste:

- Accumulate the waste in a Satellite Accumulation Area (SAA) with a completed Hazardous Waste label.
- Keep container closed at all times except when adding waste.
- Contact RHM for pick-up within nine (9) months of the Accumulation Start Date or when the container is almost full, whichever comes first.

You also have the option to **recycle** lead or silver solder:

- Collect solder residue in an appropriately sized plastic container. Label the container (Example: "Scrap Metal – Lead Solder"). Include your name and contact information.
- When the container is full, contact [Donation, Utilization, and Sales Group \(DUS\)](#) to arrange for drop-off.
- **Do not** place solder in a scrap metal recycling bin.

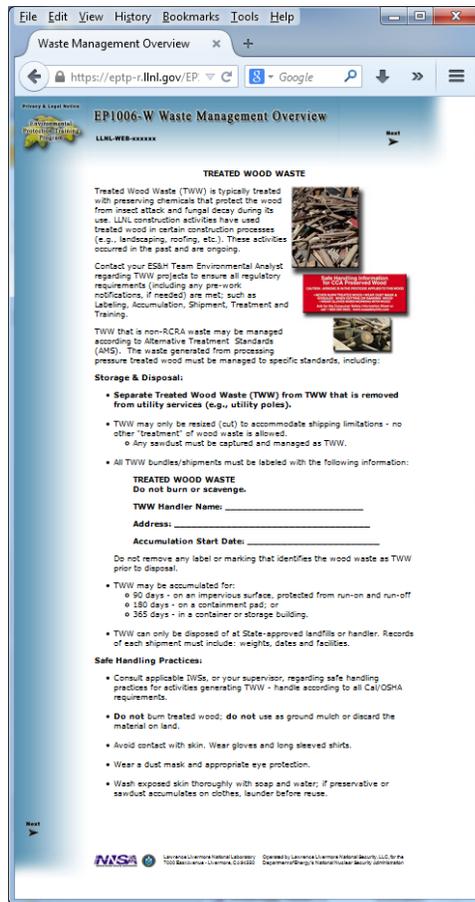
If you generate soldering waste that **does not** contain lead or silver, it may be hazardous for other metal oxides.

- Review the product's Safety Data Sheet (SDS), and then contact your ES&H Team Environmental Analyst and/or RHM Technician for proper waste characterization.

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TREATED WOOD WASTE

Treated Wood Waste (TWW) is typically treated with preserving chemicals that protect the wood from insect attack and fungal decay during its use. LLNL construction activities have used treated wood in certain construction processes (e.g., landscaping, roofing, etc.). These activities occurred in the past and are ongoing. Contact your ES&H Team Environmental Analyst regarding TWW projects to ensure all regulatory requirements (including any pre-work notifications, if needed) are met; such as Labeling, Accumulation, Shipment, Treatment and Training.

TWW that is non-RCRA waste may be managed according to Alternative Treatment Standards (AMS). The waste generated from processing pressure treated wood must be managed to specific standards, including:

Storage & Disposal:

- **Separate Treated Wood Waste (TWW) from TWW that is removed from utility services (e.g., utility poles).**
- TWW may only be resized (cut) to accommodate shipping limitations - no other "treatment" of wood waste is allowed.
 - Any sawdust must be captured and managed as TWW.
- All TWW bundles/shipments must be labeled with the following information:

TREATED WOOD WASTE

Do not burn or scavenge.

TWW Handler Name: _____

Address: _____

Accumulation Start Date: _____

Do not remove any label or marking that identifies the wood waste as TWW prior to disposal.

- TWW may be accumulated for:
 - 90 days - on an impervious surface, protected from run-on and run-off
 - 180 days - on a containment pad; or
 - 365 days - in a container or storage building.
- TWW can only be disposed of at State-approved landfills or handler. Records of each shipment must include: weights, dates and facilities

Safe Handling Practices:

- Consult applicable IWSs, or your supervisor, regarding safe handling practices for activities generating TWW - handle according to all Cal/OSHA requirements.
- **Do not burn treated wood; do not use as ground mulch or discard the material on land.**
- Avoid contact with skin. Wear gloves and long sleeved shirts.
- Wear a dust mask and appropriate eye protection.
- Wash exposed skin thoroughly with soap and water; if preservative or sawdust accumulates on clothes, launder before reuse.

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WASTEWATER

Do not dispose of hazardous waste down laboratory or shop sinks. You must collect it and manage it as hazardous waste.

If your work generates wastewater, it is your responsibility to know which wastewater may be disposed of to the sanitary sewer, which must go to a retention tank system, and which must be collected and managed for disposal.

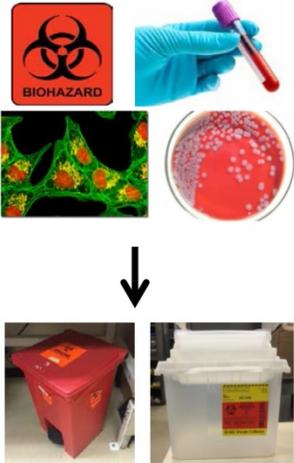
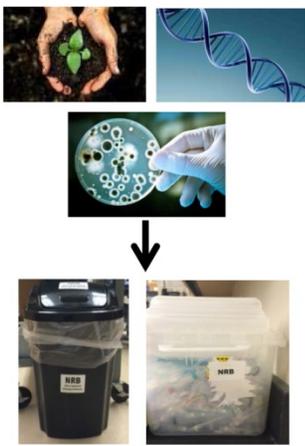
If you have any questions, contact your Field Environmental Analyst or the Environmental Functional Area Wastewater SME for assistance.

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Waste-Stream Specific Information – BIOLOGICAL WASTE STREAMS

BIOLOGICAL WASTE				
MEDICAL WASTE ¹				
Biohazardous Waste	Pathology Waste	Pharmaceutical Waste	Trace Chemotherapeutic Waste	Non-Red bag Biological (NRB) Waste
<p>Biological waste generated at LLNL is governed by a number of regulatory agencies. The state of California regulates Medical Waste under the California Medical Waste Management Act (MWMA). Medical waste includes biohazardous, pathology, pharmaceutical, trace chemotherapeutic and trauma scene waste. A number of other regulatory agencies, including the Centers for Disease Control and Prevention (CDC), the National Institutes of Health (NIH) and the United States Department of Agriculture (USDA), also require biological waste to be decontaminated prior to disposal. Below is a brief description of the Biological Waste streams that may be generated at LLNL. Specific information for managing these waste streams is provided in PRO-2758 Biological Waste Management and training for biological waste generators is provided in either HS4435/HS4435-RW Working Safely in Biosafety Level 1 Laboratories or HS4436/HS4436-RW Working Safely in Biosafety Level 2 Laboratories.</p> <p>Waste contaminated with or potentially contaminated with Risk Group 2 (RG2) or higher biological agents or materials (e.g., RG2 or higher microbes, human blood, blood components and body fluids, human and non-human primate [NHP] cell lines).</p> 	<p>Includes:</p> <ol style="list-style-type: none"> 1. Human body parts (excluding teeth) that are contaminated with RG2 or higher biological agent or material. 2. Human body parts that have been fixed in formaldehyde or other fixative. 3. Carcasses, parts, tissues and fluids of research animals infected with a RG2 or higher biological agent or material. 	<p>Consists of <u>expired or unused prescription or over-the-counter drugs</u> that are <u>hazardous waste</u> (i.e., hazardous only in the state of CA), but are not federally regulated RCRA waste and are not radioactive. Includes human or veterinary pharmaceuticals:</p> <ol style="list-style-type: none"> 1. Purchased/acquired from a pharmacy; AND 2. Manufactured for research purposes not specifically formulated for human/veterinary consumption. 	<p>Waste contaminated through contact with, or having previously contained, chemotherapeutic agents, including but not limited to, solid lab trash, sharps, liquid waste (e.g., spent liquid media) and empty containers that held chemotherapeutic agents.</p> 	<p>Waste contaminated with or potentially contaminated with Risk Group 1 (RG1) biological agents or materials (e.g., RG1 microorganisms, confirmed non-viable organisms, recombinant DNA subject to the <i>NIH Guidelines</i>, animal (except NHP) cell lines, and cell cultures/tissue of plant origin).</p> 
<p>All waste streams can include: solid lab trash, standard (i.e., California-regulated) sharps (e.g., needles, needle/syringe combinations, Pasteur pipettes, scalpels, razor blades), non-standard (i.e., not regulated by the state of California) sharps (e.g., serological pipettes, pipette tips, swabs with wooden shafts), and liquid waste.</p>				

¹ Medical waste also consists of Trauma Scene Waste. Trauma scene waste is rarely generated at LLNL. In the event of a trauma scene, the waste will be managed by a registered Trauma Scene Waste Management Practitioner.