Laboratory Guide

For Managing Dangerous Waste

DEPARTMENT OF
ECOLOGY
State of Washington

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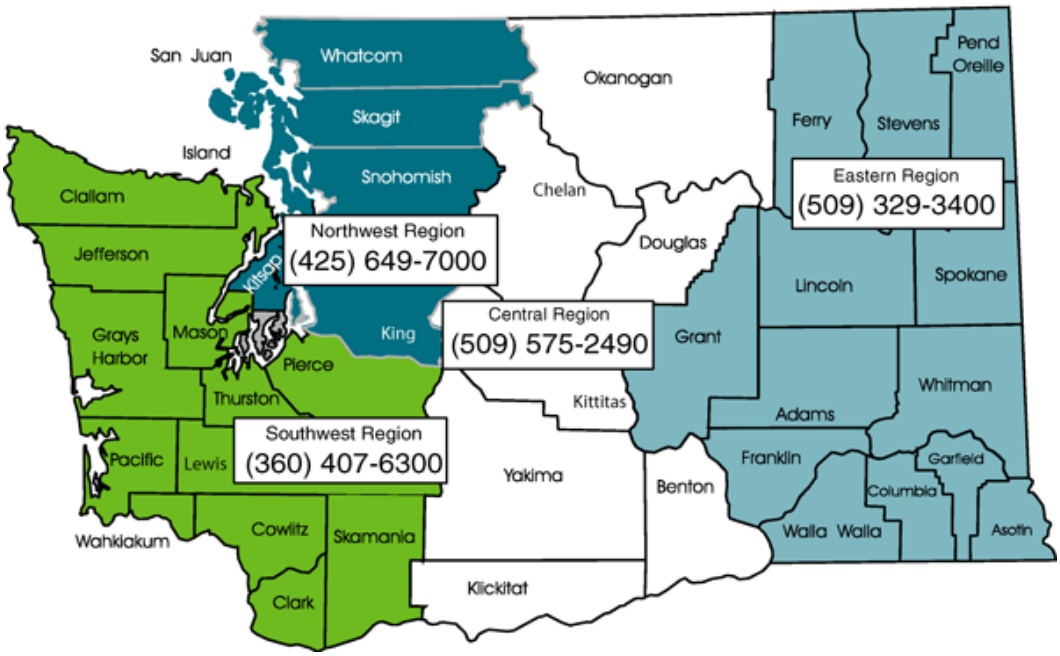

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Introduction

Laboratories regularly generate hazardous or dangerous wastes.[1] If improperly managed, dangerous wastes can pose threats to your health, safety, and the environment. Proper storage, designation, treatment, and disposal of chemical waste can prevent serious consequences of catastrophic events or accidents.

The Washington Department of Ecology (Ecology) also works with schools and laboratories to reduce or even eliminate the use of hazardous substances, including toxic metals. Contact your regional office to learn how our Toxics Reduction staff can help you find safer alternatives to hazardous substances, increase efficiency, and potentially save money in the process.

The top ten violations of the Dangerous Waste Regulations, Chapter 173-303 Washington Administrative Code[2] (WAC) often seen in laboratories include:

1. Containers improperly labeled, WAC 173-303-200(1)(d)
2. Containers left open or unlatched risking a potential spill, WAC 173-303-630(5)(a)
3. Universal waste improperly labeled, WAC 173-303-573(10)
4. Accumulation start dates not marked or clearly visible, WAC 173-303-200(1)(c)
5. Weekly inspections lacking or inadequate, WAC 173-303-630(6)
6. Universal waste accumulation start dates not marked or accumulation limit exceeded, WAC 173-303-573(11)
7. Used oil containers left open or unlatched, WAC 173-303-515(6)
8. Waste not designated or improperly designated, WAC 173-303-070(3)
9. Generator not reporting or improperly reporting, WAC 173-303-220(1)
10. Secondary containment lacking or not compliant, WAC 173-303-630(7)

This guide will help you prevent these violations and comply with the dangerous waste regulations, avoiding costly penalties. For more information about common dangerous waste violations found during inspections, visit *Common Dangerous Waste Compliance Issues* on Ecology's website.

[1] Federal law uses the term *hazardous waste*. Washington law uses the term *dangerous waste*. Washington's definition of dangerous waste includes some wastes not included in the federal definition.
[2] Addresses for all the links referenced in this document are available, beginning on page 37.

Proper Labeling for Containers

All containers accumulating dangerous waste on site (including containers in satellite accumulation areas) are subject to container labeling requirements. This is an on-site requirement only. Labeling containers for transporting dangerous waste is covered under the U.S. Department of Transportation (U.S. DOT) labeling requirements (WAC 173-303-190(2) and by reference, 49 CFR Part 172).

Each container used to accumulate dangerous waste must be clearly labeled or marked with the words "Dangerous Waste" or "Hazardous Waste." Also include the waste name, nature of the risk such as, "Corrosive" or "Ignitable," and if the container is in a facility's primary accumulation area, the date the waste was first placed in the container. Accumulation start date is not required on satellite containers until 55 gallons are accumulated. Be sure to remove all labels when the container is emptied, unless it will be reused for the same substance.

Label Size and Placement

There is no size limit or requirement for risk labels on containers. But they need to be *clearly visible and legible* so individuals can recognize, avoid, and properly respond to the risk(s) from a safe distance. Place labels on the visible portion of the container, not towards the wall. See page 31 for a visual of properly labeled containers.

Risk Labels

Each container must also be clearly marked to quickly identify the risk(s) associated with the waste it contains. A container can be labeled with multiple risks. For example, a container labeled "Toxic" could also be labeled "Flammable." Under the dangerous waste regulations, there is no set list or required number of risk labels for accumulation containers on-site.

Wastes may exhibit any number of these or other risks:

- Toxic
- Poison
- Ignitable
- Flammable
- Carcinogenic
- Reactive
- Explosive
- Corrosive or solid corrosive
- Contains nano-particles

Risk labels must be affixed to or written directly on the container and be easily seen and understood by employees, emergency response personnel, and the public. They must also comply with all local, state, and federal regulations. Free risk labels can be printed from Ecology's website. In most cases, U.S. DOT and International Fire Code labels are also acceptable for use.

Another option is the Occupational Safety and Health Administration (OSHA) Globally Harmonized System (GHS) hazard labels and pictograms. GHS labels will be required on chemical products by December 2015, but are not required on containers of dangerous waste. GHS pictograms can serve as risk labels when used with risk words, as previously described. However, *GHS pictograms alone are not enough*; they do not adequately and clearly describe the possible risks.

Unacceptable Risk Labels

The U.S. DOT has a "Class 9 (Miscellaneous Dangerous Goods)" risk label for shipping purposes. This label should not be used for waste risk labeling. It does not adequately identify risk(s) associated with the waste inside the container.

Other unacceptable examples include a simple color dot or a color-coded container, even with a nearby sign explaining the color code. The color code is meaningless to the public, time-consuming to emergency response personnel, and could possibly confuse employees. The sign could also be destroyed, obscured, or moved and the color code system fails.

Accumulation Start Date

For medium and large quantity generators[3], dangerous waste containers not managed in satellite areas must be clearly marked with an accumulation start date. This is the date the first drop of waste enters the container. Medium quantity generators have 180 days, and large quantity generators have 90 days from the date accumulation begins to remove dangerous waste from their facility.

Containers in a satellite accumulation area must be marked with an accumulation start date once you accumulate 55-gallons of dangerous waste or one quart of extremely hazardous waste (EHW). The container must then be moved to a dangerous waste storage or accumulation area within three days.

[3] See Counting Your Dangerous Waste section, on page 7, for information about your generator status.

Dangerous Waste Containers

Use a container made of material that is compatible with the waste. The container must be intact with no holes or corrosion and *MUST be closed* unless you are actively adding or removing waste. This includes containers in satellite accumulation areas. If wastes are added or removed frequently, consider using a funnel with a latching lid.

Laboratory equipment, including high performance liquid chromatography (HPLC) and gas chromatography machines, may have containers that continually receive waste. These containers may require a vent to prevent malfunctions or incorrect readings. To capture vapors, the vent may also need to be equipped with a filter. However, the container must still be closed to minimize releases. Completely close the container when the machine is not in operation.

Although used oil is not typically generated in labs, many labs have maintenance facilities. These facilities will generate many of the same waste streams as automotive shops including used oil. All containers used to accumulate used oil must also be closed unless adding or removing used oil.

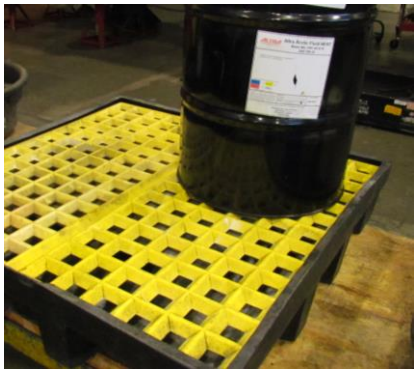
For more information on container management:

- Refer to Ecology's publication *Shop Guide for Dangerous Waste Management*.
- Watch Ecology's video *Dangerous Waste Containers: An Open and Shut Case*.

Secondary Containment

The following requirements apply to all medium and large quantity generator container accumulation areas.

- Container accumulation areas must have enough secondary containment capacity to hold all of the largest container of liquid dangerous waste, or ten percent of the total volume of liquid dangerous waste, whichever is greater.



- The base of the secondary containment underlying the containers must be free of cracks and gaps, and have an impervious surface to contain leaks, spills, and accumulated rainwater.
- Dangerous wastes that do not contain free liquids and are not ignitable or reactive do not require secondary containment capacity if:
  - They are elevated to avoid contact with any accumulated liquids.
  - Stored in a sloped area to drain liquid resulting from rainfall.

Visit Ecology's website for more information about secondary containment. Or request a copy of Ecology's publication, *Guidance for Assessing Dangerous Waste Secondary Containment Systems*.

Compatibility

Storing incompatible chemicals together is extremely dangerous. They could react by releasing toxic or flammable gases, exploding, or spontaneously igniting.

- Store reactive and ignitable wastes according to the Uniform Fire Code.
- Secondary containment systems for incompatible waste must be separate.
- Segregate and store chemicals in dedicated cabinets by hazard class to reduce the risk of reactions between incompatible chemicals.
- Label storage cabinets and cupboards with the hazard class of the stored materials.
- Safety data sheets (SDSs) – (formerly material safety data sheets, or MSDSs) should be available for all chemicals on-site. Review them for information about incompatibilities.

King County's Local Hazardous Waste Management Program has a *Laboratory Waste Management Guide* that contains a partial list of common incompatible chemicals that can react with each other.

Waste Designation

Designation is the process of determining if a waste is dangerous and what the hazards are. It's the first step in managing your dangerous waste properly. All waste streams generated at your facility must be properly designated. Learn more at our designation website, which features a video overview and interactive tool to help you designate.

Some common dangerous wastes found in labs include:

- Spent solvents
- Inorganic waste
- Organic waste
- Corrosive waste
- Metal waste
- Discarded chemical products (due to changes in procedures or product degradation)

Tips to designating your wastes:

- Complete a list of all waste streams generated at your facility.
- Maintain records of your designation process including test results, waste analyses, or other determinations (e.g., generator knowledge) made for designating dangerous waste.
- Once you have properly designated each waste, you may choose to consolidate dangerous wastes with similar waste codes to facilitate storage and disposal. It is essential that you have accurate designation information for each waste stream before combining them.
- Train staff on the designation status of all wastes at your facility. This will aid personnel in the proper handling and disposal of wastes.

For more information on designating your dangerous waste:

- Visit our designation web page.
- Watch our designation video *Designate Your Waste – Is it Dangerous?*
- Refer to the publication *Designating Dangerous Waste*.
- Contact your Ecology regional office.

Counting Dangerous Waste

Once you know you have dangerous waste, you must "count" it. Counting is measuring the weight of your dangerous waste. The amount of waste generated per month determines the "generator status" (small, medium, or large quanity generator) of a business. That status determines the rules that apply. Different counting requirements apply to different types of dangerous wastes and the activities that generate the wastes.

For more information about counting dangerous waste, refer to Ecology's web page or publication *Counting Dangerous Waste Under the Dangerous Waste Regulations*.

Weekly Container Inspections

Medium and large quantity generators must inspect all containers of dangerous waste not managed in satellite areas every week. The containers and container system should be checked for leaks and deterioration. Ecology also recommends checking that all containers are closed and properly labeled. A handy *Weekly Inspection Checklist* is available to help.

An inspection log must be filled out for each inspection. **At a minimum,** it must include:

- The date and time of the inspection.
- The PRINTED NAME and HANDWRITTEN SIGNATURE of the inspector.
- Notes of the observations made.
- Date and nature of any repairs or remedial actions taken.

Keep the inspection log at the facility for at least five years from the date of inspection.

Generator Reporting

Dangerous waste generators with an active RCRA[4] Site Identification Number are required to report their dangerous waste generation activities and quantities annually. Dangerous Waste Annual Reports must reflect the most current information and dangerous waste activities at your site. In addition to the Dangerous Waste Annual Report:

- A revised Site Identification form must be submitted notifying Ecology of any changes in company name, mailing address, ownership, physical location, or type of dangerous waste activity.
- A revised Site Identification form must be submitted prior to adding or dropping any of these activities; permitted treating, storing, and/or disposing, immediate recycling, transporting, permit by rule, and/or treatment by generator.

Radioactive Waste

Radioactive materials are used in many laboratory settings, including academic, research, and medical. Radioactive waste generated from the use of radioactive materials must be transferred to a licensed radioactive waste facility.

[4] Resource Conservation and Recovery Act

The Washington Department of Health regulates radioactive materials. Contact their Office of Radiation Protection at 360-236-3300, or find a technical assistance provider for radioactive material.

Universal Waste

Universal wastes are certain dangerous wastes that may be managed under less stringent regulatory requirements when recycled. In Washington, three waste categories can be managed as UW:

1. Batteries
2. Lights and Lamps
3. Mercury-containing equipment

Advantages of UW management are that the wastes are not counted toward generator status and are not reported on your Dangerous Waste Annual Report.

- A handler of UW may not treat nor dispose of these wastes.
- Universal Wastes must be carefully stored to prevent breakage and release of toxic constituents to the environment.
- UW must be sent to a facility equipped and permitted to handle and recycle it.
- UW items or containers must have a label indicating the type of UW. For example, "Universal Waste - Battery," "Waste Battery," or "Used Battery."
- A Universal Waste handler must track how long their UW has been accumulated to avoid exceeding the one- year storage requirement.

The table below lists some of the most common Universal Wastes and best management practices for managing them.

Universal Waste	Best Management Practices
• Old computers and monitors • Portable or laptop computers (including "tablet computers") • E-readers (also called e-book readers) • Cell phones • Televisions	• Purchase using EPEAT. • Use e-Stewards certified electronic recyclers. • Use E-Cycle Washington. • Send for reuse. • Use vendor take-back programs.

Universal Waste	Best Management Practices
• Spent batteries For more information refer to Ecology's Universal Waste Rule for Batteries.	• Use rechargeable lithium batteries. • Use zinc air batteries. • Implement a battery collection program and recycle as Universal Waste.
• Spent fluorescent lamps (light bulbs) • Mercury-containing equipment For more information refer to Ecology's Universal Waste Rule for Lamps or Mercury-containing Equipment.	• Use low-mercury or energy-efficient lamps. • Use non-mercury-containing equipment. • Recycle whole, unbroken fluorescent lamps as Universal Waste. • Broken fluorescent lamp debris must be managed as dangerous waste. • Recycle waste mercury-containing equipment and fixtures as Universal Waste.

Green Chemistry

Green chemistry is a way to design chemicals, processes, and experiments so they are safer, healthier, and more sustainable. It seeks to prevent pollution at its source by creating chemicals that are not toxic. This eliminates exposure to toxic chemicals for workers, consumers, and the environment. It also encourages using renewable ingredients, reducing energy use, and optimizing other factors that are better for human health and the environment.

Ecology uses the principles of green chemistry to help Washington State businesses be more innovative, profitable, and competitive while protecting human health and the environment. It also supports educators by providing sustainable educational tools. Ecology's initiative to Reduce Toxic Threats focuses on prevention strategies. The elimination of toxic chemicals in products is the surest way to avoid pollution.

Green Chemistry in the Lab

There are a number of ways laboratories can incorporate the principles of green chemistry into their processes. A few examples include:

Choose experiments, instrumentation, and processes that reduce or eliminate hazardous substances. Sometimes, a different approach will eliminate the need of a hazardous chemical. The University of Oregon compiled a database (GEMS) of green chemistry laboratory exercises.

Reduce the amount of waste.

- Review your synthesis and evaluate your reactions by measuring Atom Economy and by using efficiency tools. The American Chemical Society Green Chemistry Institute's (ACS-GCI) Pharmaceutical Roundtable developed some green chemistry process efficiency tools and guides for safer selections.
- Consider alternative procedures. Sometimes an alternative procedure will require less material to be used. Examples include: microscale, different extraction methods.

Identify a safer alternative.

- Look for alternatives and assess the hazards of the alternatives. Sometimes a less hazardous chemical can be used in place of a hazardous chemical in a given process. EPA's Safer Chemical Ingredients List contains chemicals that meet the standards and safer chemical ingredient criteria of the Safer Choice Program. The list is arranged by functional-use class to help product manufacturers identify safer chemical alternatives and is updated periodically to reflect new data and innovations in safer chemistry. The Interstate Chemicals Clearinghouse developed a Chemical Hazard Assessment Database to enable users to search for free GreenScreen® and Quick Chemical Assessment Tool (QCAT) chemical hazard assessments.

For more information and additional resources, visit Ecology's Green Chemistry website.

Pollution Prevention and Best Management Practices

These are good practices for managing dangerous wastes in your lab. Follow them to reduce excess waste, find safer alternatives, and keep your workplace safe.

Reduce and Manage Dangerous Waste

- Use chemical inventory and tracking software to centralize product ordering, improve product tracking, reduce disposal of expired product, and minimize duplicate orders to prevent unnecessary disposal.
- Use energy-efficient computer and electronic equipment, and appliances.

- Replace mercury-containing equipment with non-mercury equipment.
- Purchase only the quantity of chemicals needed. Use the least amount of chemicals required for each experiment or process to reduce the volume of waste. Don't take donations of chemicals; if you don't use them, you will end up paying for their disposal.
- Use Environmentally Preferable Purchasing (EPP). Before ordering chemicals for use, determine anticipated rate of use, shelf life, required personal protective equipment and handling procedures, appropriate storage locations, and disposal method.
- Check with your vendors to see if they have take-back programs (manufacturers or other organizations may accept materials so they can be refilled, reused, recyled, or disposed of safely).
- Keep a log of wastes treated or recycled on-site. Count and report amount of treated waste, and any dangerous waste residues resulting from treatment. Note: this may be regarded as treatment by generator and thus require reporting on your dangerous waste annual report.
- Check with the Department of Transportation for proper dangerous waste transportation and disposal requirements. Remember to properly manifest dangerous waste for shipment.
- Don't accumulate over 55 gallons of any one dangerous waste or one quart of extremely hazardous waste (EHW) in a satellite accumulation area.
- Drastically reduce waste generation by reducing the scale of experiments and procedures. Micro/semi-micro equipment is available through scientific glass manufacturers.
- Use multi-element standards for instrument calibration.
- Plug floor drains or protect them from spills by installing silicon caulk around the rim of the drain as a berm. Don't dispose of dangerous waste to the sewer or any septic system.
- Diluting wastes to meet sewer discharge limits or dangerous waste thresholds is illegal. *Dilution is not a solution*!
- Don't dispose of dangerous waste in the trash, sharps containers, or medical waste red bags.
- Don't evaporate volatile organic compounds (VOCs).

Use Safer Alternatives

- Choose experiments or processes that do not use hazardous substances. Use analytical or instrumentation methods that eliminate the use of hazardous chemicals.
- Use alternatives with caution. Compare your options for alternative products or processes to understand which is the least hazardous, feasible option. Tools are available to help evaluate the hazards and functions of potential alternatives. Contact your Ecology regional office for assistance with alternative assessments. Learn more about alternative assessments on Ecology's website. There you will find tools, such as Green Screen or QCAT to help you.
- Research laboratory product alternatives to replace toxic metals and other hazardous substances with less toxic or non-hazardous products.
- Research method minimization techniques to reduce use of toxic metals and hazardous substances.
- Recycle and reclaim chemicals on-site or use a commercial recycler. Use chemical exchanges such as IMEX. Return unused chemicals to the manufacturer whenever possible.
- Specific examples of chemical substitution:
  - Use iron-salicylic complex instead of copper-ammonia complex in Beer's Law studies.
  - Use organic oxidants for chromium (VI) oxidants-oxalyl chloride/dimethyl sulfoxide in Swern oxidation of alcohols.
  - Use supercritical carbon dioxide for organic solvents in high-performance chromatography.
  - Use copper sulfate catalysts for mercury sulfate or selenium metal catalysts in Kjeldahl analyses.
  - Use methyl tert-butyl ether for diethyl ether (does not form explosive peroxides).
  - Use alcohol fixative instead of formaldehyde and citric acid-based preparatory chemicals.
  - Use "No-Chromix," enzymatic cleaners, detergents, instead of chromerge (sulfuric acid-sodium dichromate).

Store Chemicals Safely

- Secure shelves to cabinets, walls, and the floor. Use shelf supports sturdy enough to withstand the weight of chemicals stored and to prevent tipping over in an earthquake.
- Close and latch doors on chemical storage cabinets.

- Install non-porous shelves with lips to help contain spills. Ecology highly recommends earthquake lips.
- Store bulk chemical reagents in a central storage and distribution center for better control of inventory.
- Store chemicals and acids in dedicated cabinets. Vent acid cabinets to prevent hazardous build-up of vapors. **Do NOT** vent flammable liquid cabinets unless they are piped directly outside with an explosion-proof fan.
- Oxidizers, such as nitric acid, can be stored in a cabinet but should be isolated in their own secondary containment.
- Store both organic and inorganic acids in an acid cabinet, but separate with secondary containment. Glacial acetic acid is an ignitable liquid. Keep it away from oxidizing acids like sulfuric, nitric, and perchloric acids. Store glacial acetic acid with other organic acids or in the flammable storage cabinet.
- Store chemical products by compatibility: acids with acids, bases with bases. **Oxidizers should be stored separate from all other chemicals (including other oxidizers) in lidded compatible containers**. Store flammables and poisons in dedicated cabinets.
- Install adequate ventilation and exhaust fan systems in chemistry labs and storerooms.
- Order chemicals in plastic-coated bottles to reduce the risk of breakage. Write the date on containers when they arrive to track chemical use. Regularly check expiration dates. See discussion of shelf life versus expiration date for chemical standards.
- If a chemical is used infrequently, tape the lid with a last used date. Return all chemicals to their designated storage location promptly.
- The Laboratory Safety Standard requires the creation and implementation of a Chemical Hygiene Plan (CHP) and training for all lab staff. The CHP must include proper labeling, and safe handling, storage, and disposal of hazardous chemicals. See WAC 296-828.
- Don't store chemicals above eye level, above sinks, on top of cabinets, in the fume hood, or on the floor. Never store liquid chemicals above dry chemicals. Do not leave open reagents in the hood when not in use.
- Have separate containers for trash and broken glass. The glass may be recyclable.
- Don't block aisles, escape routes, fire doors, fire extinguishers, or emergency washing equipment with stored chemicals.

Personal Health and Safety

- Wear ANSI[5] approved eye and face protection. Wear gloves that are resistant to the specific chemical being used and are free of holes, rips, or tears. Wear a chemical resistant lab coat or apron and closed toe shoes. Restrain loose clothing, jewelry, and hair.
- Wash hands frequently during and after working in the laboratory.
- Have an action plan with emergency procedures and escape routes. Conduct annual fire and spill drills.
- Ensure appropriate types of spill cleanup and fire suppression equipment are readily available. Know how to use the equipment properly. Inspect fire extinguishers and spill kits monthly. Keep path to emergency washing equipment clear.
- Ensure eyewash fountains and safety showers will supply at least 15 minutes of fresh water flow. Test and run eyewash weekly, and the safety shower biannually. Instruct lab staff on proper use of emergency washing equipment, including having the affected person roll eyeballs and lift lids.
- Obtain Safety Data Sheets (SDS) for each chemical currently in use. Digital SDSs are only acceptable if your facility has an emergency generator or off-site access. Review SDSs prior to using chemicals. Make sure co-workers and students understand them and know the necessary health and safety precautions. Always inform co-workers when dangerous work is planned.
- Train laboratory staff in first aid, CPR, how to handle dangerous materials, and spill emergencies. Conduct internal environmental, health, and safety audits annually to improve procedures and correct problems. Here is a helpful checklist.
- Never pipette by mouth.
- Before adopting new lab procedures and experiments, analyze them for hazards. Maintain a log of safety-related incidents, even if there is no injury.
- Never eat, drink, or smoke in the laboratory or storage room. Don't store food in a chemistry or biology refrigerator, or laboratory environment.
- Never leave heat sources unattended (gas burners, hot plates, sand baths).
- Don't store reagents or chemicals on lab bench. Don't store chemicals above or around sinks. Don't mix chemicals in sinks.

[5] American National Standards Institute

- Don’t intentionally evaporate organic wastes in the hood. Don’t store chemicals or wastes in hood. Cover or berm all sinks in hoods to prevent spilled materials from entering sink drain. Never lean into the fume hood during use. Use proper ventilation systems/fume hoods while working with highly toxic and volatile substances.

Annual Cleanup Rule for College and University Laboratories

A new rule went into effect January 18, 2015 that provides an alternative, optional set of generator requirements applicable to laboratories owned by or affiliated with colleges and universities. Affiliated laboratories could include art and photography schools, teaching hospitals, and other off-campus research laboratories.

These optional standards provide flexible regulations specific to waste generation and accumulation in laboratories at colleges and universities. One benefit of the rule allows yearly clean out of laboratory stockrooms without requiring the wastes to be counted toward generator status. See Chapter 173-303-235 WAC.

Please contact your regional Ecology office for more information on the rule change, and how to notify Ecology if you want to use the alternative rule.

Treatment by Generator

In certain circumstances, waste can be treated to make it less hazardous, non-hazardous, or easier and safer to transport. Waste is usually treated at a facility with a dangerous-waste treatment permit. Under certain conditions, generators may treat their own wastes on-site without a permit. This is called treatment by generator or TBG.

Small quantity generators who decide to use treatment by generator *must follow guidance* described in Ecology's *Small Quantity Generators Treating Dangerous Waste*.

Treatment by Generator Applies to

TBG requirements of the Dangerous Waste Regulations, WAC 173-303-170(3)(b) and (c), apply to:

- Large and medium quantity waste generators who treat their own dangerous wastes on site.
- Large and medium quantity generators who treat their own special waste on site.

- Large and medium quantity generators who treat their dangerous waste for disposal.

Treatment by Generator Does NOT Apply to

- Wastes treated in a wastewater treatment unit or elementary neutralization unit discharging to a publicly owned treatment works (POTW) under a wastewater discharge permit or authorization. In this case, the Permit by Rule requirements in WAC 173-303-802(5) would apply instead.
- Wastes that will be recycled, reclaimed, or reused. For example, solvent distillation and photo processing silver recovery is not treatment by generator.
- Small quantity generators (SQG) who treat their own waste. However, SQGs are allowed to do TBG if they follow the guidance in Ecology publication, *Small Quantity Generators Treating Dangerous Waste*. SQGs not following this guidance may be required to follow large quantity generator regulations or stop treating their waste.

Treatment by Generator Requirements

- Treat wastes only in containers, tanks, or containment buildings (see "*Special Waste*" for an exception at WAC 173-303-170(3)(c)).
- Use containers that meet all container standards (WAC 173-303-200(1)(b)(i)).
- Use tanks that meet all tank standards (WAC 173-303-200(1)(b)(ii)).
- Use containment buildings that meet the requirements of WAC 173-303-200(1)(b)(iv).
- Meet all accumulation requirements that apply, based on your facility's dangerous waste generator status (WAC 173-303-200, -201, -202).
- Maintain a log showing the date and amount of waste treated. (WAC 173-303-170(3)(b).

Treatment must not:

- Use a process involving heat that would destroy the waste or its constituents.
- Involve applying waste to the land or mixing it into the soil (land treatment).
- Use detonation or open burning.
- Allow the generation of extreme heat or pressure.
- Cause a fire, explosion, or violent reaction.
- Produce uncontrolled toxic mists, fumes, dusts, or gases.
- Produce uncontrolled flammable fumes or gases.
- Threaten to damage the structural integrity of the facility or device containing the waste.
- Use dilution for the sole purpose of evading the designation of a waste as dangerous.
- Threaten human health or the environment.
- Evaporate organic liquids.

Treatment by Generator Accumulation Time Limit

Any treatment residues that are dangerous wastes keep the accumulation start date of the original waste being treated.

For instance, when a dangerous waste sludge is treated by evaporation to reduce the volume by removing water, the remaining dry sludge is still a dangerous waste. If the accumulation start date for the wet sludge before treatment is March 8th, the accumulation start date for the dry sludge after treatment is also March 8th. A new accumulation time limit does not begin for the sludge when it is removed from the treatment unit. These time limits also apply for multi-stage, multi-vessel processes.

Treatment by Generator Reporting and Recordkeeping

Site Identification Form

Prior to beginning the treatment process, you must submit a Site Identification Form or revise your existing form to include TBG (Checkbox #7 in Section 10 of the form). Generators must note the type of treatment in the comment section, (such as neutralization, filtration, or solidification and stabilization). For more information on the Site Identification Form call 1-800-874-2022.

Dangerous Waste Annual Report

Annual reporting and generator status determinations must include the total quantity of waste (including weight of any liquids) generated prior to treatment and the weight of any dangerous waste remaining after treatment. For more information on the Dangerous Waste Annual Report, call 1-800-874-2022.

Waste Treatment Log

Generators must maintain a written log of all dangerous waste treated on site, including the date of treatment and the amount of each dangerous waste treated. Keep the log on site for a minimum of five years. An example of a waste treatment log is on page 21.

Treatment by Generator Discharge to Sewer after Treatment

Sometimes dangerous waste is treated to prepare it for discharge to a sewer under the Domestic Sewage Exclusion or permit by rule.

Domestic Sewage Exclusion

If a waste is still a dangerous waste after treatment under the TBG requirements, it must meet these requirements of the Domestic Sewage Exclusion before it can be discharged to a sewer leading to a Publicly Owned Treatment Works (POTW):

- The waste must be treatable in the POTW where it will be received. Dilution is not considered acceptable treatment.
- The waste must be mixed with domestic sewage before it is discharged to a public sewer.
- The discharger must have a permit or written authorization from the appropriate authority allowing the discharge of that specific waste. To receive a permit, the discharger will need to follow pollution prevention measures.

Permit by Rule

If the dangerous waste, treatment process, and the resulting discharge to a POTW are covered by a wastewater discharge permit, the treatment and discharge may be regulated under Permit by Rule rather than TBG. Please refer to this regulation for more details and requirements.

Learn more about specific types of on-site treatment from our publications:

- Filtration, #96-413
- Evaporation, #96-414
- Carbon Adsorption, #96-415
- Solidification, #96-416
- Elementary Neutralization, #96-417
- Separation and Distillation, #96-418
- Polymerization, #14-04-002
- Aldehyde Deactivation, #14-04-003

Common Laboratory Treatment by Generator Methods

Elementary Neutralization:

This treatment can only be used on wastes that are regulated solely because they exhibit the characteristic of corrosivity from having a pH of less than or equal to 2.0, or greater than or equal to 12.5.

If the aqueous waste carries any additional listed or characteristic hazardous waste codes other than "characteristic corrosive," it cannot be neutralized and disposed of to the sanitary sewer. Instead, it must be managed as a dangerous waste.

Carbon Adsorption:
Carbon adsorption uses activated carbon to remove constituents from a liquid or gaseous waste. Carbon adsorption generates a treated waste, spent carbon, and sometimes a backwash waste stream.

Carbon adsorption allowed when treated effluent and backwash are properly managed and disposed, spent carbon is regenerated or disposed properly, spills and releases are promptly cleaned, equipment is decontaminated as needed and sufficient time is provided for the carbon to adsorb contaminants.

Works well with:	Does not work well with:
aromatic solvents, chlorinated organics, phenols, polynuclear aromatics, organic pesticides, chlorinated non-aromatics, high molecular weight aliphatics, chlorine, halogens, antimony, arsenic, bismuth, chromium, tin, silver, mercury, and cobalt	alcohols, low molecular weight ketones, organic acids, aldehydes, low molecular weight aliphatics, nitrates, phosphates, chlorides, bromides, iodides, lead, nickel, copper, cadmium, zinc, barium, and selenium

Evaporation:
This treatment is only used for inorganic waste mixed with water. Secondary containment is provided for the evaporator. All organic vapors from organic solutions must be captured. Any sludges that might remain need to be designated and then managed appropriately.

Treatment by Generator Resources

- Treatment by Generator online.
- Ecology publication, *Treatment by Generator*, (revised February 2014), provides guidance for treating wastes on-site.
- To request a RCRA Site ID Number or notify Ecology of TBG or other dangerous waste activities, use this form.
- *Hazardous Waste: More common than you think*, (revised March 2004), is a quick checklist of dangerous waste requirements for regulated generators.

Current *Treatment by Generator* requirements, printable in Word, or pdf.

Other Resources

Contact Ecology directly at 360-407-6700 for assistance in obtaining any of these resources. Publications and full-sized posters are also available on request.

Rehab the Lab: Science Classroom & Lab Safety Reference and Checklist

The Science Classroom and Lab Safety Reference and Checklist is a resource designed to help schools comply with health and safety practices required by code and incorporate recommended guidelines to ensure prudent practices. The reference is designed for online use or to be downloaded and used as a checklist during annual safety inspections.

Universal Waste Resources

- E-Cycle Washington
- EPEAT
- e-Stewards Electronic Recyclers
- Universal Rule, WAC 173-303-573
- Universal Rule for Batteries: WAC 173-303-573(2)
- Universal Rule for Mercury-containing Equipment: WAC 173-303-573(3, 4)
- Universal Rule for Lamps: WAC 173-303-573(5)
- Universal Waste website

Example of a Treatment Log

DATE OF TREATMENT	HAZARDOUS WASTE CONSTITUENTS	TREATMENT METHODS	AMOUNT OF WASTE TREATED	COMMENTS

DEPARTMENT OF ECOLOGY
State of Washington

Weekly Inspection Checklist
for Hazardous Waste Container Accumulation Area

For the Month of_____, _____

Mark answers Yes or No below

Week 1	Week 2	Week 3	Week 4	Week 5					

	Date	Time	Inspector's Printed Name AND Signature
Week 1	/ /		
Week 2	/ /		
Week 3	/ /		
Week 4	/ /		
Week 5	/ /		

Are all drums and containers marked or labeled as hazardous waste (or "waste pending analysis")?

Are all drums and containers marked with the risk associated with the waste?

Are all containers (excluding satellite containers) marked with the accumulation start date?

Are any drums near or exceeding the LQG 90-day or MQG 180-day timeframe?

Are all drum labels visible and readable?

Are all containers closed?

Are all drums and containers in good condition?

Are any drums leaking?

Is there 30 inches of aisle space between rows of containers?

Containment

Is the secondary containment free of cracks or other failures?

Are sumps clean and free of contamination, spills, leaks, and standing water?

Safety Equipment

This section is not required for weekly inspections but will meet the general facility inspection requirements.

Are fire extinguishers charged?

Are spill kits stocked?

Is the first aid cabinet stocked?

Is the emergency shower and eye wash station functioning properly?

Are the emergency communication devices operating properly?

Is emergency response information posted near all communication devices? **(MQG only)**

Comments: Describe the actions taken to correct each deficiency noted above, and note date each action was taken.

Reference Washington Dangerous Waste Regulations, Chapter 173-303 WAC for further information, specifically, WAC 173-303-200(1)(b) and by reference 630(6).

Ecology Publication Number 12-04-019, rev. July 2013

Guide for Dangerous Waste (DW) Generators in Washington State Quick Reference Guide

Publication #98-1252 - HWTR *Revised June 2014*

Dangerous Waste Regulations			
	Large Quantity Generator (LQG) Generates > 2,200 lbs/mo DW or >2.2 lbs/mo of Acute Hazardous Waste (AHW) or WT01 (EHW)	**Medium Quantity Generator (MQG)** Generates 220-2,200 lbs/mo	**Small Quantity Generator (SQG)** Generates <220 lbs/mo DW or <2.2 lbs/mo of Acute Hazardous Waste (AHW) or WT01 (EHW)
Dangerous Waste Designation	Determine if waste is covered by regulations. **WAC 173-303-070**	Determine if waste is covered by regulations. **WAC 173-303-070**	Determine if waste is covered by regulations. **WAC 173-303-070(8),070**
Identification Number and Required Notices	File DW Site Identification Form to notify and obtain ID number. **WAC 173-303-060,170**	File DW Site Identification Form to notify and obtain ID number. **WAC 173-303-060,170**	Not required. **WAC 173-303-070(8)**
Labeling, Marking of Waste During Accumulation	Label with the words "Hazardous Waste" or "Dangerous Waste," the start date, and the risk. **WAC 173-303-200(1)(c),(1)(d)**	Label with the words "Hazardous Waste" or "Dangerous Waste," the start date, and the risk. **WAC 173-303-200(1)(c),(1)(d)**	Major risk label required by L&I/DOSH and some local Health Departments. **WAC 173-303-070(8)**
Waste Generation Amount	More than 2,200 lbs/mo DW or more than 2.2 lbs/mo Acute Hazardous Waste (AHW) or WT01 (EHW). **WAC 173-303-200**	Between 220 lbs/mo and 2,200 lbs/mo. **WAC 173-303-200**	Less than 220 lbs/mo DW less than 2.2 lbs/mo AHW or WT01 (EHW). **WAC 173-303-200**
Waste Accumulation Amount	No volume limit. **WAC 173-303-200(1)**	Not to exceed a total of 2,200 lbs. **WAC 173-303-201(1),(2)**	Not to exceed a total of 2,200 lbs. **WAC 173-303-070(8)(a)**
Accumulation Time Limit	90 days. **WAC 173-303-200**	180 days. **WAC 173-303-201(2)(a)**	No limit. **WAC 173-303-070(8)**
Satellite Accumulation Areas	55 gallons DW or 1 quart AHW. **WAC 173-303-200(2)**	55 gallons DW or 1 quart AHW. **WAC 173-303-200(2)**	Does not apply.
Accumulation Area and General Inspections	Must be scheduled, documented, and deficiencies corrected. **WAC 173-303-200(1)**	Must be scheduled, documented, and deficiencies corrected. **WAC 173-303-201, 202**	Not required. **WAC 173-303-070(8)**

Dangerous Waste Regulations			
	Large Quantity Generator (LQG) Generates > 2,200 lbs/mo DW or > 2.2 lbs/mo of Acute Hazardous Waste (AHW) or WT01 (EHW)	**Medium Quantity Generator (MQG)** Generates 220-2,200 lbs/mo	**Small Quantity Generator (SQG)** Generates <220 lbs/mo DW or <2.2 lbs/mo of Acute Hazardous Waste (AHW) or WT01 (EHW)
Personnel Training	Required written plan.	Familiarize employees with proper waste handling and emergency procedures. Also see Cont. Plan & Emergency Procedures below.	Written plan not required by DW regulation, but Hazard Communications required by L&I/DOSH.
	WAC 173-303-200(1)(e),330	**WAC 173-303-201(2)(c)**	**WAC 173-303-070(8)**
Preparedness and Prevention	• Minimize fire, explosion, release. • Communication systems (internal and external), fire control. • Test/maintain communication and control equipment. • Access to communications or alarm system. • Adequate aisle space. • Arrangements with local authorities.	• Minimize fire, explosion, release. • Communication systems (internal and external), fire control. • Test/maintain communication and control equipment. • Access to communications or alarm system. • Adequate aisle space. • Arrangements with local authorities.	Not required.
	WAC 173-303-200(1)(e)	**WAC 173-303-200(1)(e)**	**WAC 173-303-070(8)**
Contingency Plan and Emergency Procedures	• Written plan. • Arrangements with local emergency response agencies (ER). • Emergency coordinator (EC) (phone, address). • Emergency equipment list. • Evacuation plan. • Plan distribution to police, fire departments, hospitals, and local agencies. • Plan must be amended if it fails in an emergency or there are changes in the facility, equipment, or personnel. • EC must respond.	• Emergency coordinator (EC) onsite/on call. • Post: EC name and phone number. • Post: Location of fire extinguishers/spill control/fire alarm. • Post: Fire department phone. • Familiarize employees with proper waste handling and emergency procedures. • EC must respond.	Not required. Check L&I/DOSH.
	WAC 173-303-200(1)(e)	**WAC 173-303-201(2)(c)**	**WAC 173-303-070(8)**
Additional Reporting for Emergencies	Report spill, fire, explosion, release.	Report spill, fire, explosion, release.	Report spills if threat to human health and the environment.
	WAC 173-303-145,200(1)(e)	**WAC 173-303-145,201(2)(c)(iv)**	**WAC 173-303-070(8)(b)(ii),145**

Dangerous Waste Regulations			
	Large Quantity Generator (LQG) Generates > 2,200 lbs/mo DW or > 2.2 lbs/mo of Acute Hazardous Waste (AHW) or WT01 (EHW)	**Medium Quantity Generator (MQG)** Generates 220-2,200 lbs/mo	**Small Quantity Generator (SQG)** Generates <220 lbs/mo DW or <2.2 lbs/mo of Acute Hazardous Waste (AHW) or WT01 (EHW)
Waste Containers	• Good condition. • Non-leaking. • Compatible with waste. • Closed/protected. • 30" aisle space. • Response to spills. • Leaks, emergencies. • Weekly inspections. • Ignitable, reactive, incompatible waste. • Containment system.	• Good condition. • Non-leaking. • Compatible with waste. • Closed/protected. • 30" aisle space. • Response to spills. • Leaks, emergencies. • Weekly inspections. • Ignitable, reactive, incompatible waste. • Containment system.	Manage waste in way that does not pose a threat. Local regulations may apply.
	WAC 173-303-200(1)(b), 200(1)(b)(i)	**WAC 173-303-200(1)(b), 200(1)(b)(i)**	**WAC 173-303-070(8)**
Waste Tanks	• Assessment. • Design, installation. • Containment, release, direction. • Operating requirements. • Daily inspections. • Response to spills, leaks. • Closure, post closure. • Ignitable, reactive, incompatible waste.	• Operating requirements. • Daily/weekly inspections. • Closure, post closure. • Ignitable, reactive, incompatible waste. • Freeboard requirement. • Ignitable, reactive, incompatible waste.	Local regulations may apply.
	WAC 173-303-200(1)(b), 200(1)(b)(i)	**WAC 173-303-202**	**WAC 173-303-070(8)**
Disposal of Dangerous Waste	Ship to permitted TSD or DW recycler. Uniform Manifest Form required.	Ship to permitted TSD or DW recycler. Uniform Manifest Form required.	Ship off-site or treat on-site: permitted TSD or permitted to manage moderate risk waste or legitimate recycle or other permitted solid waste facility.
	WAC 173-303-200(1)(a)	**WAC 173-303-200(1)(a)**	**WAC 173-303-070(8)**
Packaging, Labeling, Marking for Transport	Package, label and mark per USDOT (49 CFR).	Package, label and mark per USDOT (49 CFR).	Refer to DOT Regulations.
	WAC 173-303-190(1),(2),(3), (5),(6)	**WAC 173-303-190(1),(2),(3), (5),(6)**	**WAC 173-303-070(8)**
Placarding for Transport	Must offer placard.	Must offer placard.	Refer to DOT Regulations.
	WAC 173-303-190(4)	**WAC 173-303-190(4)**	**WAC 173-303-070(8)**
Manifest	Use for shipments off-site.	Use for shipments off-site.	Not required – only bill of lading.
	WAC 173-303-180	**WAC 173-303-180**	**WAC 173-303-070(8)**
Annual Reporting	File every year.	File every year.	File every year, if have ID#. Site Identification form only.
	WAC 173-303-220(1), 170(2)	**WAC 173-303-220(1), 170(2)**	**WAC 173-303-070(8)(b)(iv)**

Dangerous Waste Regulations			
	Large Quantity Generator (LQG) Generates > 2,200 lbs/mo DW or > 2.2 lbs/mo of Acute Hazardous Waste (AHW) or WT01 (EHW)	**Medium Quantity Generator (MQG)** Generates 220-2,200 lbs/mo	**Small Quantity Generator (SQG)** Generates <220 lbs/mo DW or <2.2 lbs/mo of Acute Hazardous Waste (AHW) or WT01 (EHW)
Exception Reporting	45 days: if no signed manifest from TSD returned.	45 days: if no signed manifest from TSD returned.	Not required.
	WAC 173-303-170(2)	**WAC 173-303-220(2)**	**WAC 173-303-070(8)**
Recordkeeping	5 years: manifests 5 years: annual reports, exception reports, test results.	5 years: manifests 5 years: annual reports, exception reports, test results.	Not required, but encouraged.
	WAC 173-303-210(1),(2),(3)(a)	**WAC 173-303-210(1),(2),(3)(a)**	**WAC 173-303-070(8)**
Waste Minimization	• For generators > 2,640 lbs/yr: plan to minimize waste required. • Written plan and program in place to minimize hazardous waste volume, toxicity. • Submit executive summary to WDOE. • 5 year updates.	• Good faith effort to minimize waste and selected best waste management method. • For generators > 2,640 lbs/yr: Plan to minimize waste required. • Submit executive summary to WDOE. • 5 year updates.	Not required.
	WAC 173-307	**WAC 173-307**	
Recycled, Reclaimed, Recovered Waste	Depending on the circumstances, recycled used oil, recycled car batteries, other recycled wastes partially or fully exempt.	Depending on the circumstances, recycled used oil, recycled car batteries, other recycled wastes partially or fully exempt.	Depending on the circumstances, recycled used oil, recycled used batteries, other recycled wastes partially or fully exempt.
	WAC 173-303-120,500-525	**WAC 173-303-120,500-525**	**WAC 173-303-120,500-525**
Regulating Agency	Ecology	Ecology	Ecology/ County Health District
Universal Waste	Standards for universal waste management (batteries, mercury-containing equipment, and lamps).	Standards for universal waste management (batteries, mercury-containing equipment, and lamps).	Standards for universal waste management (batteries, mercury-containing equipment, and lamps).
	WAC 173-303-573	**WAC 173-303-573**	**WAC 173-303-573**

This Quick Reference Guide summarizes the requirements for each generator status under the *Dangerous Waste Regulations* (Chapter 173-303 WAC), but does not replace them. Always refer to the regulations for details or call a hazardous waste specialist at your nearest Ecology Regional Office.

Central Regional Office	**509-575-2490**	**Eastern Regional Office**	**509-329-3400**
Northwest Regional Office	**425-649-7000**	**Southwest Regional Office**	**360-407-6300**

To ask about available formats for the visually impaired please call the Hazardous Waste and Toxics Reduction Program at 360-407-6700. Persons with hearing loss can call 711 for Washington Relay Service. Persons with a speech disability can call 877-833-6341.

DANGEROUS WASTE EMERGENCY INFORMATION

Emergency Coordinator	**Name:** _____	**Map of facility with emergency equipment, exit routes, and alarm locations:**
	Phone: _____	
Alternate:	**Name:** _____	
	Phone: _____	
Fire Department:	**Phone:** _____	
Hospital:	**Phone:** _____	
Police:	**Phone:** _____	

Fire alarm is located: _____

Spill-control equipment is located: _____

_____

Fire extinguishers are located: _____

_____

_____

IN CASE OF A SPILL OR OTHER CHEMICAL EMERGENCY, ALSO CALL:

- **NATIONAL RESPONSE CENTER: 1-800-424-8802**
- **WASHINGTON EMERGENCY MANAGEMENT DIVISION: 1-800-258-5990 OR 1-800-OILS-911**
- **DEPARTMENT OF ECOLOGY REGIONAL OFFICE** _____

For Technical Assistance, call your Ecology Regional Office or go to www.ecy.wa.gov/programs/hwtr .

Ecology Publication Number 08-04-022

If you have special accomodation needs that require this in an alternative format, please call 360-407-6700 or 360-407-6006 (TDD).

DEPARTMENT OF ECOLOGY
State of Washington

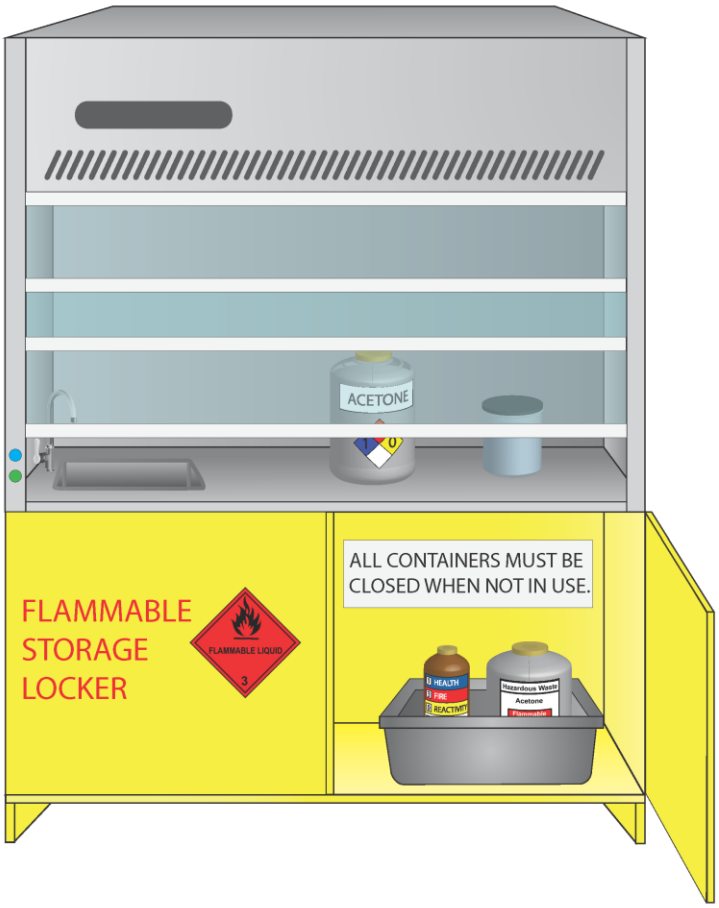
Managing Dangerous Laboratory Waste

WORK SAFELY
Keep the hood sash lowered at the minimum possible while working, with work at least 6" inside the sash.

FIRE PROTECTION
Keep a fire extinguisher nearby.

WEAR PERSONAL PROTECTIVE EQUIPMENT
PPE should be worn if there is the possibility of exposure.

LABEL ALL CONTAINERS
Containers must be labeled, with the name of the substance, the words "hazardous waste" or "dangerous waste", the major risk, and the accumulation start date.



DO NOT DUMP HAZARDOUS WASTE DOWN ANY SINK OR DRAIN

SECONDARY CONTAINMENT
Must contain 10% of the free liquid in all containers or 100% of the free liquid in the largest container, whichever is larger.

SEGREGATE WASTES
Incompatible wastes need to be stored in a separate area.

DO NOT STACK WASTES
Wastes cannot be stacked on top of one another.

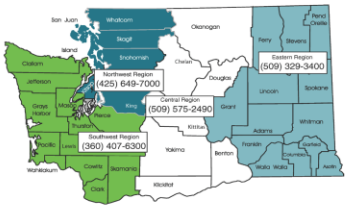
HOOD STORAGE
Wastes should be stored in a storage locker, not inside the fume hood.

DEPARTMENT OF ECOLOGY
State of Washington

Dangerous Waste: Do It Right!

Questions? Please call your regional dangerous waste specialist at the Department of Ecology.

For more information about managing dangerous waste, visit us online:
www.ecy.wa.gov/programs/hwtr/managewaste.html



Ecology Publication # 15-04-005

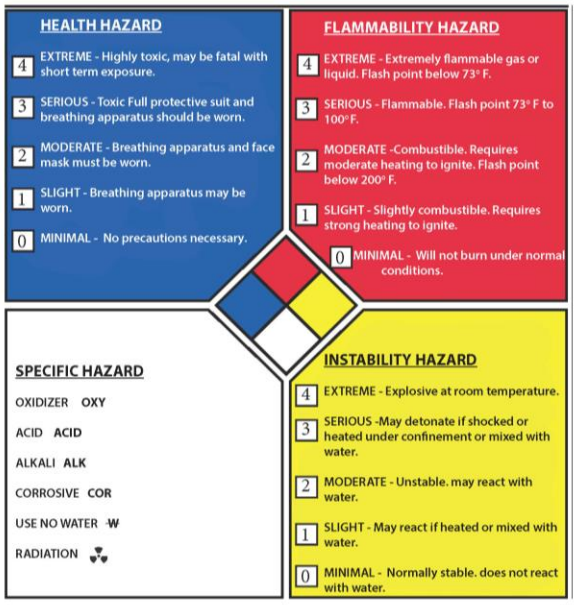
Label Dangerous Laboratory Waste - It's The Law!

LABEL ALL CONTAINERS

Containers must be labeled, regardless of size, with the name of the substance, the words "hazardous waste" or "dangerous waste", the major risk, and the accumulation start date.

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) LABEL SYSTEM

The NFPA diamond or list is a common labeling system in laboratories, used to quickly and easily identify the risks posed by hazardous materials.



IT'S THE LAW

Generators of dangerous waste must label it properly according to Washington State and Federal laws. Inadequate labeling is THE most common violation found during compliance inspections. Avoid violating the regulations by labeling your containers properly.

DEPARTMENT OF ECOLOGY
State of Washington

Dangerous Waste: Do It Right!

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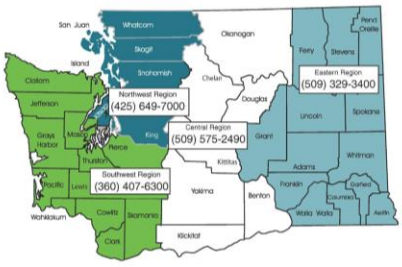
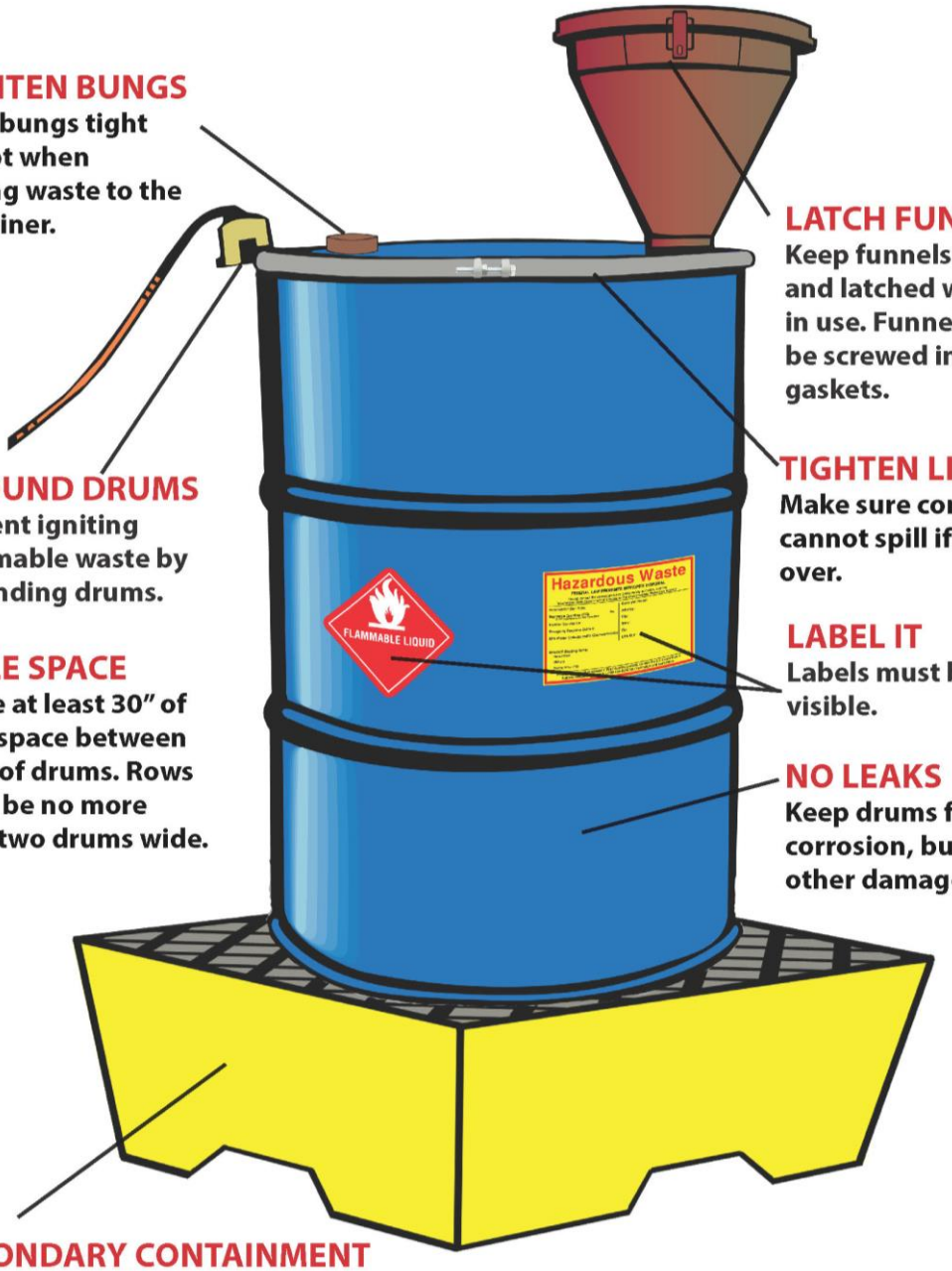
For more information about managing dangerous waste, visit us online:
www.ecy.wa.gov/programs/hwtr/managewaste.html



Ecology Publication # 15-04-004
To request ADA accommodation or materials in a format for the visually impaired, call Ecology at 360-407-6700, Relay Service 711, or TTY 877-833-6341.

Inspect Your Dangerous Waste Drums



TIGHTEN BUNGS
Keep bungs tight except when adding waste to the container.

LATCH FUNNELS
Keep funnels closed and latched when not in use. Funnels must be screwed in with gaskets.

GROUND DRUMS
Prevent igniting flammable waste by grounding drums.

TIGHTEN LIDS
Make sure contents cannot spill if tipped over.

AISLE SPACE
Leave at least 30" of aisle space between rows of drums. Rows must be no more than two drums wide.

LABEL IT
Labels must be visible.

NO LEAKS
Keep drums free of corrosion, bulges, and other damage.

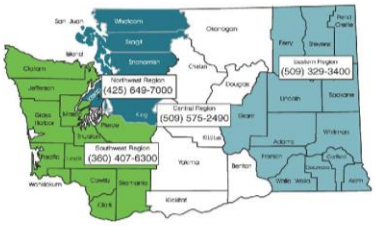
SECONDARY CONTAINMENT
Secondary containment must be large enough to contain 10% of the free liquid in all containers or 100% of the free liquid in the largest container, whichever is larger.

DEPARTMENT OF ECOLOGY
State of Washington

Dangerous Waste: Do It Right!

Questions? Please call your regional dangerous waste specialist at the Department of Ecology.

For more information about managing dangerous waste, visit us online:
www.ecy.wa.gov/programs/hwtr/managewaste.html



Reference Chapter 173-303-200/-630, Use and Management of Containers. Thanks to Idaho Department of Environmental Quality for original poster concept. Ecology Publication #08-04-015, revised June 2014.
To request ADA accommodation or materials in a format for the visually impaired, call Ecology at 360-407-6700, Relay Service 711, or TTY 877-833-6341.

Check Your Dangerous Waste Accumulation Area

COVERED AREA
Prevent rainwater from filling up secondary containment.

PROPER SIGNS
Use appropriate warning signs for the area.

PHONE
Keep a communication device nearby in case of emergencies.

FIRE PROTECTION
Keep a fire extinguisher nearby.

SPILL KIT
Keep a spill kit within the area.

SEGREGATE WASTES
Incompatible wastes need to be in a different area to avoid fire or explosion.

SECONDARY CONTAINMENT
Must contain 10% of the free liquid in all containers or 100% of the free liquid in the largest container, whichever is larger.

AISLE SPACE
Leave at least 30" of aisle space between rows of drums. Rows must be no more than two drums wide.

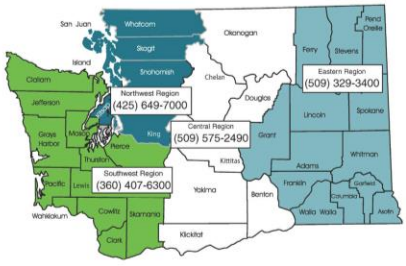
VISIBLE LABELS
All labels must be readable without having to move materials.

DEPARTMENT OF ECOLOGY
State of Washington

Dangerous Waste: Do It Right!

Questions? Please call your regional dangerous waste specialist at the Department of Ecology.

For more information about managing dangerous waste, visit us online:
www.ecy.wa.gov/programs/hwtr/managewaste.html



Ecology Publication # 15-04-006
To request ADA accommodation or materials in a format for the visually impaired, call Ecology at 360-407-6700, Relay Service 711, or TTY 877-833-6341.

Hyperlink Addresses

Below are complete link addresses found in this booklet, listed by section.

Introduction

Dangerous Waste Regulations, Chapter 173-303 Washington Administrative Code (WAC):
http://app.leg.wa.gov/WAC/default.aspx?cite=173-303

Accumulation container labeling, WAC 173-303-200(1)(d):
http://app.leg.wa.gov/WAC/default.aspx?cite=173-303-200

Accumulation start dates marked and visible, WAC 173-303-200(1)(c):
http://app.leg.wa.gov/WAC/default.aspx?cite=173-303-200

Open containers, WAC 173-303-630(5)(a):
http://app.leg.wa.gov/WAC/default.aspx?cite=173-303-650

Universal waste labeling and marking, WAC 173-303-573(10):
http://app.leg.wa.gov/WAC/default.aspx?cite=173-303-573

Universal waste accumulation start dates marked and visible; accumulation limits, WAC 173-303-573(11):
http://app.leg.wa.gov/WAC/default.aspx?cite=173-303-573

Weekly inspections, WAC 173-303-630(6)
http://app.leg.wa.gov/WAC/default.aspx?cite=173-303-630

Used oil containers, WAC 173-303-515(6):
http://app.leg.wa.gov/WAC/default.aspx?cite=173-303-515

Waste designation, WAC 173-303-070(3):
http://app.leg.wa.gov/WAC/default.aspx?cite=173-303-070

Generator reporting, WAC 173-303-220(1):
http://app.leg.wa.gov/WAC/default.aspx?cite=173-303-220

Secondary containment, WAC 173-303-630(7)
http://app.leg.wa.gov/WAC/default.aspx?cite=173-303-630

Common Dangerous Waste Compliance Issues:
www.ecy.wa.gov/programs/hwtr/p2/schoolsandlabs/schoolsandlabstool/dw_issues.html

Proper Labeling for Containers

Print free labels from Ecology's website:
http://www.ecy.wa.gov/programs/hwtr/hw_labels/index.html

U.S. Department of Transportation (DOT):
www.fmcsa.dot.gov/regulations/hazardous-materials/how-comply-federal-hazardous-materials-regulations

Preparing dangerous waste for transport, WAC 173-303-190(2):
http://app.leg.wa.gov/WAC/default.aspx?cite=173-303-190

Hazardous materials table, special provisions, hazardous materials communications, emergency response information, training requirements, and security plans, 49 CFR Part 172: www.ecfr.gov/cgi-bin/text-idx?tpl=/ecfrbrowse/Title49/49cfr172_main_02.tpl

U.S. DOT labels and placards:
http://www.fmcsa.dot.gov/regulations/hazardous-materials/hazardous-materials-brochures

Occupational Safety and Health Administration (OSHA) Globally Harmonized System: https://www.osha.gov/dsg/hazcom/index.html

Ecology publication 98-414*, Counting Dangerous Waste Under the Dangerous Waste Regulations*:
https://fortress.wa.gov/ecy/publications/summarypages/98414.html

Dangerous Waste Containers

Ecology publication 09-04-015, *Shop Guide for Dangerous Waste Management*:
https://fortress.wa.gov/ecy/publications/summarypages/0904015.html

Ecology video 13-04-006, *Dangerous Waste Containers: An Open and Shut Case*:
https://fortress.wa.gov/ecy/publications/summarypages/1304006.html

Secondary Containment

Ecology secondary containment web pages:
http://www.ecy.wa.gov/programs/hwtr/manage_waste/secondary_containment.html

Ecology publication 95-420, *Guidance for Assessing Dangerous Waste Secondary Containment Systems*:
https://fortress.wa.gov/ecy/publications/summarypages/95420.html

Compatibility

Uniform Fire Code: http://www.nfpa.org/codes-and-standards/document-information-pages?mode=code&code=45

King County Local Hazardous Waste Management Program publication SQG-LABS-1, *Laboratory Waste Management Guide*:
http://www.labwasteguide.org/

Waste Designation

Ecology's waste designation website:
http://www.ecy.wa.gov/programs/hwtr/designation

Federally listed wastes:
http://www.epa.gov/osw/hazard/wastetypes/listed.htm

State dangerous waste characteristics:
http://www.ecy.wa.gov/programs/hwtr/manage_waste/identify_categories_dw.html

Waste codes: http://www.ecy.wa.gov/programs/hwtr/waste-report/waste_codes.htm

Ecology's Designation web pages:
http://www.ecy.wa.gov/programs/hwtr/designation/index.html

Ecology publication 96-436, *Designating Dangerous Waste*:
https://fortress.wa.gov/ecy/publications/summarypages/96436.html

Ecology video 15-04-011, *Designation Your Waste – Is it Dangerous?*:
https://www.youtube.com/watch?v=MuuQK8lLQM4

Generator Reporting

Ecology Dangerous Waste Annual Report web page:
http://www.ecy.wa.gov/programs/hwtr/waste-report/index.html

Ecology Site Identification form:
http://www.ecy.wa.gov/programs/hwtr/waste-report/notification.html

Counting Dangerous Waste

Ecology Count Dangerous Waste web page:
http://www.ecy.wa.gov/programs/hwtr/manage_waste/count_waste.html

Ecology publication 98-414, *Counting Dangerous Waste Under the Dangerous Waste Regulations*:
https://fortress.wa.gov/ecy/publications/summarypages/98414.html

Radioactive Waste

Washington Department of Health Office of Radiation Protection:
http://www.doh.wa.gov/communityandenvironment/radiation.aspx

Technical assistance providers for radioactive material:
http://www.doh.wa.gov/CommunityandEnvironment/Radiation/RadioactiveMaterials/TechnicalAssistanceProviders

Resource Conservation and Recovery Act (RCRA):
http://www2.epa.gov/laws-regulations/summary-resource-conservation-and-recovery-act

Universal Waste

Ecology Universal waste web page:
http://www.ecy.wa.gov/programs/hwtr/manage_waste/universal_waste.html

EPEAT: http://www.epeat.net/

e-Stewards: http://e-stewards.org/

E-Cycle Washington:
http://www.ecy.wa.gov/programs/swfa/eproductrecycle/

Ecology publication 98-407, *Universal Waste Rule: WAC 173-303-573*:
https://fortress.wa.gov/ecy/publications/SummaryPages/98407.html

Ecology publication 98-407a, *Universal Waste Rule for Batteries: WAC 173-303-573(2)*:
https://fortress.wa.gov/ecy/publications/SummaryPages/98407a.html

Ecology publication 98-407b, *Universal Waste Rule for Mercury-containing Equipment: WAC 173-303-573(3,4)*:
https://fortress.wa.gov/ecy/publications/SummaryPages/98407b.html

Ecology publication 98-407c, *Universal Waste Rule for Lamps: WAC 173-303-573(5)*:
https://fortress.wa.gov/ecy/publications/SummaryPages/98407c.html

Green Chemistry

University of Oregon database of green chemistry laboratory exercises (GEMS): http://greenchem.uoregon.edu/

Atom Economy: http://www.acs.org/content/acs/en/greenchemistry/what-is-green-chemistry/principles/gc-principle-of-the-month-2.html

American Chemical Society – Green Chemistry Institute (ACS-GCI) Pharmaceutical Roundtable green chemistry process efficiency tools and guides for safer selections: http://www.acs.org/content/acs/en/greenchemistry/research-innovation/tools-for-green-chemistry.html

EPA Safer Chemical Ingredients List: http://www2.epa.gov/saferchoice/safer-ingredients

Chemical Hazard Assessment Database: http://theic2.org/hazard-assessment

Chemical hazard assessments: http://www.ecy.wa.gov/programs/hwtr/p2/GreenChem/chazassess.html

Ecology Green Chemistry website: http://www.ecy.wa.gov/GreenChemistry/index.html

Pollution Prevention and Best Management Practices

Environmentally Preferable Purchasing: http://www.ecy.wa.gov/programs/swfa/epp/

U.S. Department of Transportation (DOT): www.fmcsa.dot.gov/regulations/hazardous-materials/how-comply-federal-hazardous-materials-regulations

Ecology Alternatives Assessment web page: http://www.ecy.wa.gov/programs/hwtr/p2/GreenChem/chazassess.html

Green Screen Chemical Assessment Tool:
http://www.greenscreenchemicals.org/

QCAT Chemical Assessment Tool:
http://www.ecy.wa.gov/programs/hwtr/ChemAlternatives/QCAT.html

International Materials Exchange (IMEX):
http://www.hazwastehelp.org/imex/

Shelf life versus expiration date for chemical standards discussion :
http://inorganicventures.com/shelf-life-vs-expiration-date-chemical-standard

Chemical Hygiene Plan requirements:
http://lni.wa.gov/FormPub/Detail.asp?DocID=2716

American National Standards Institute (ANSI): http://www.ansi.org/

Safety audit checklist:
http://www.hazwastehelp.org/educators/labchecklist.aspx

New Rule for College and University Laboratories

New rule: http://app.leg.wa.gov/WAC/default.aspx?cite=173-303-235

Treatment by Generator

Ecology publication, *Small Quantity Generators Treating Dangerous Waste*:
https://fortress.wa.gov/ecy/publications/SummaryPages/1404004.html

Ecology publication, *Treatment by Generator*:
https://fortress.wa.gov/ecy/publications/SummaryPages/96412.html

Ecology Treatment by Generator web page:
http://www.ecy.wa.gov/programs/hwtr/manage_waste/treatment_by_generator.html

Treatment by Generator requirements of the Dangerous Waste Regulations: http://apps.leg.wa.gov/wac/default.aspx?cite=173-303-170

Permit by Rule requirements of the Dangerous Waste Regulations: http://apps.leg.wa.gov/wac/default.aspx?cite=173-303-802

TBG – Special Waste: http://apps.leg.wa.gov/wac/default.aspx?cite=173-303-170

TBG – Container standards: http://apps.leg.wa.gov/wac/default.aspx?cite=173-303-200

TBG – Tank standards: http://apps.leg.wa.gov/wac/default.aspx?cite=173-303-200

TBG – Containment building requirements: http://apps.leg.wa.gov/wac/default.aspx?cite=173-303-200

TBG – Accumulation requirements: http://apps.leg.wa.gov/wac/default.aspx?cite=173-303-200

TBG – Treatment log requirement: http://apps.leg.wa.gov/wac/default.aspx?cite=173-303-170

TBG – Site Identification Form: http://www.ecy.wa.gov/programs/hwtr/reportingrequirements.html

TBG – Dangerous Waste Annual Report: http://www.ecy.wa.gov/programs/hwtr/reportingrequirements.html

TBG – Domestic Sewage Exclusion: http://apps.leg.wa.gov/wac/default.aspx?cite=173-303-071

Ecology publication, *Treatment by Generator – Filtration*: https://fortress.wa.gov/ecy/publications/summarypages/96413.html

Ecology publication, *Treatment by Generator – Evaporation*: https://fortress.wa.gov/ecy/publications/summarypages/96414.html

Ecology publication, *Treatment by Generator – Carbon Adsorption*:
https://fortress.wa.gov/ecy/publications/summarypages/96415.html

Ecology publication, *Treatment by Generator – Solidification*:
https://fortress.wa.gov/ecy/publications/summarypages/96416.html

Ecology publication, *Treatment by Generator – Elementary Neutralization*:
https://fortress.wa.gov/ecy/publications/summarypages/96417.html

Ecology publication, *Treatment by Generator – Separation and Distillation*:
https://fortress.wa.gov/ecy/publications/summarypages/96418.html

Ecology publication, *Treatment by Generator – Polymerization*:
https://fortress.wa.gov/ecy/publications/SummaryPages/1404002.html

Ecology publication, *Treatment by Generator – Aldehyde Deactivation*:
https://fortress.wa.gov/ecy/publications/SummaryPages/1404003.html

Resources

Rehab the Lab Safety Reference and Checklist:
http://www.hazwastehelp.org/educators/labchecklist.aspx

Ecology publication, *Hazardous Waste: More common than you think* checklist:
https://fortress.wa.gov/ecy/publications/SummaryPages/9112a.html

Printable quick Treatment by Generator requirements:
http://www.ecy.wa.gov/programs/hwtr/p2/schoolsandlabs/schoolsandlabstool/TBG.html

Ecology publication, *Weekly Inspection Checklist*:
https://fortress.wa.gov/ecy/publications/SummaryPages/1204019.html

Ecology publication, *Guide for Dangerous Waste Generators in Washington State – Quick Reference Guide*:
https://fortress.wa.gov/ecy/publications/summarypages/981252hwtr.html

Ecology publication, *Dangerous Waste Emergency Information* placard: https://fortress.wa.gov/ecy/publications/summarypages/0804022.html

Ecology publication, *Managing Dangerous Laboratory Waste*, full-color poster: https://fortress.wa.gov/ecy/publications/summarypages/1504005.html

Ecology publication, *Label Dangerous Laboratory Waste – It's the Law!*, full-color poster: https://fortress.wa.gov/ecy/publications/summarypages/1504004.html

Ecology publication, *Inspect Your Dangerous Waste Drums*, full-color poster: https://fortress.wa.gov/ecy/publications/summarypages/0804015.html

Ecology publication, *Check Your Dangerous Waste Accumulation Area*, full-color poster: https://fortress.wa.gov/ecy/publications/summarypages/1504006.html

Notes: