Hazardous Materials Management and Disposal Policy and Procedures

2025 Edition

University of Idaho

Environmental Health and Safety

PREFACE

The University of Idaho complies with the Resource Conservation and Recovery Act (and amendments), the Idaho Hazardous Waste Management Act, and all other federal and state laws, rules, and regulations pertaining to inventory, use, and disposal of hazardous materials and hazardous waste.

Failure to comply with these laws, rules and regulations is a direct violation of law and can subject the university, individuals breaking them, and responsible administrators to civil and/or criminal penalties. This manual specifies the procedures employees are expected to follow when they store, use, and/or dispose of hazardous materials and hazardous waste to ensure compliance with laws, rules, and regulations.

The nature of a university and its many activities requires that compliance with environmental requirements be a distributed responsibility. University employees are responsible for knowing and complying with these procedures. Administrators are expected to ensure that their employees are familiar with university procedures, to make copies of this manual available, and to provide opportunities for employees to attend hazardous waste and materials management training classes which are regularly presented by Environmental Health and Safety.

Distributed responsibility requires distributed accountability. It is, therefore, the policy of the University of Idaho that, if failure to comply with university policy and procedures results in violation of federal or state laws, rules, or regulations, employees whose actions gave rise to the violation(s) may be subject to disciplinary action; and if those violations result in monetary penalties, the penalties may be assessed against the operating budgets of departments whose employees' activities caused the violation(s).

EMERGENCY RESPONSE PROCEDURES SUMMARY

Fire or Ambulance 911	Environmental Health & Safety 208-885-6524

Refer to Part 600 – Subpart D, Hazardous Materials Spill and Incident Response, for more detailed information.

1. If the hazardous materials spill is small (for example, less than one liter) or in a safe location, such as in a chemical fume hood, **AND** you know and understand the hazards associated with the material, **AND** you have the proper personal protective equipment available, proceed with containment and cleanup.

   Remember, the spill cleanup material may be considered a hazardous waste and must be disposed of properly through EHS.

2. If the hazardous material spill is too large, too hazardous, or beyond your response capabilities, contact Environmental Health and Safety immediately and provide the following information:

   a) Your name and phone number.
   b) Location of the incident.
   c) Hazardous material(s) involved.
   d) Actions taken so far.
   e) Any other pertinent information.

3. **Serious Injury, Fire, or Explosion** – If the hazardous material incident involves serious injury or exposure, a fire, and/or an explosion, first call 911, and then Environmental Health and Safety. Provide the information listed in step 2 above.

4. If the situation requires immediate evacuation, advise any coworkers in the vicinity to leave the area, close the door, activate the building fire alarm if safe to do so, and exit the building. If it is not safe to activate the fire alarm due to a potential explosion hazard, notify building occupants directly and exit the building. Contact the first responder or fire chief when they arrive and explain the situation. Provide any additional information as requested.

   NOTE: All incidents involving the release of hazardous materials directly into the environment (for example, into the air, body of water, or onto the ground) must be reported to Environmental Health and Safety immediately. Call 911 if after hours.

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PART 100 - INTRODUCTION

100.01 Purpose and Scope

a. The University of Idaho is committed to providing a safe and healthy environment for all to work and learn at the university. Current trends in federal and state environmental laws and regulations also reflect increasing concern by our society for protecting the environment through responsible hazardous materials use and disposal. A proactive hazardous materials and waste management program, incorporating federal and state regulations with university procedures and guidelines for the use, handling, storage, transportation, and disposal of hazardous materials will fill a genuine need for the university community and help facilitate our commitment to protecting people, infrastructure, and the environment.

b. This manual provides specific guidelines and procedures for managing hazardous materials safely and proactive practices for hazardous materials management and waste minimization. Such practices attempt to decrease negative impacts to the university and environment by minimizing the generation of hazardous waste and eliminating problems associated with improper hazardous materials management.

   NOTE: Radioactive materials/wastes, infectious materials/wastes, and asbestos are intentionally excluded from this policy because these materials are addressed in other university policies and procedures. Contact Environmental Health and Safety (EHS) to obtain policy, information, and guidance for the management of materials and wastes not within the scope of this policy.

100.10 Individual Generator Responsibilities

a. All university faculty, staff, and students using hazardous materials are responsible for complying with the guidelines and procedures of this policy by properly identifying, characterizing, and preparing their chemical waste for evaluation, collection, and disposal by Environmental Health and Safety (EHS). Specifically, individuals using hazardous materials must be able to perform a waste determination by recognizing that the materials they are using could result in generating hazardous waste; accurately identifying and labeling all waste materials generated in their area; accumulating and storing waste materials safely; and requesting collection of their waste materials in a timely fashion by submitting electronic disposal requests to EHS. Also, every effort to minimize the quantity and/or toxicity of

hazardous waste generated must be made by each individual generator by following the waste minimization guidelines provided in this policy. *It is the responsibility of all supervisors and instructors to ensure that employees, students, guests, and visitors are aware of and follow the guidelines and procedures of this policy.* Also, every effort must be made to minimize the release of hazardous materials into the environment thereby protecting the health of all employees and university infrastructure; and manage hazardous materials according to best practices and the university's Laboratory Safety Program.

b. Unknown Generation – The generation of unknowns is a sign of poor laboratory chemical and waste management practices. Most unknowns are the result of poor or no labeling of chemical containers. EHS will charge back to the individual generator's (IG) department any costs associated with the characterization and disposal of unknowns, as this costs more than if the waste could be managed and disposed of with properly managed chemicals and waste.

c. Hazardous materials are NEVER to be delivered (or sent through the campus mail) to Environmental Health and Safety or the Hazardous Materials Storage Building (HMSB); nor taken to Facilities Recycling and Solid Waste department for disposal. These materials will be returned to their points of origin and collected only after proper disposal procedures have been followed.

100.20 EHS Personnel Responsibilities

a. EHS personnel are responsible for classifying, collecting, transporting, and disposing of hazardous materials generated by university activities. Other responsibilities include maintaining hazardous waste records; submitting hazardous waste reports; acting as a liaison with state and federal agencies; providing emergency response to chemical spills and incidents involving hazardous materials; recycling hazardous materials; and providing technical support and training for the university community. *It is ultimately the responsibility of EHS personnel to confirm whether the discarded material is, or is not, a hazardous waste*.

100.30 Regulatory Background

a. The Resource Conservation and Recovery Act (RCRA) of 1976 was passed by Congress to regulate the generation, storage, treatment, transportation, and disposal of hazardous waste in the United States. RCRA mandated the formation of the Environmental Protection Agency (EPA), which has the power to promulgate and enforce regulations governing hazardous waste activities within RCRA's guidelines and amendments. EPA regulations can be found in the Code of Federal Regulations (CFR), Title 40. RCRA set a precedent in hazardous waste management by introducing the "cradle-to-grave" concept, which makes generators liable for the hazardous waste they generate from the time of generation, through transportation, and ultimate disposal. RCRA was amended in 1980 by the Solid Waste Disposal Act, which provided for more stringent enforcement of regulations and steeper fines for violations concerning hazardous waste activities. In 1984, RCRA was again amended by the Hazardous and Solid Waste Act Amendments (HSWA), which initiated a program to restrict and ban the disposal of certain hazardous wastes in landfills, improve landfill quality, regulate

underground storage tanks, tighten hazardous waste generator regulations, require thorough inspections of state and federal facilities, and provide specific requirements for the regulation of used oil. In 1995, EPA promulgated the universal waste program to promote the collection and recycling of certain widely generated hazardous wastes. These universal wastes are subject to special management provisions intended to ease the management burden and facilitate the recycling or proper treatment and disposal of such materials. Five types of hazardous waste are currently covered under the universal waste regulations: aerosol cans, batteries, pesticides that are either recalled or collected in waste pesticide collection programs, mercury-containing equipment, and fluorescent lamps.

b. The State of Idaho has received primacy from the EPA to regulate state hazardous waste activities. Primacy allows a state to operate a hazardous waste program under the guidelines set forth by the EPA regulations that is at least as strict as those provided by the EPA. Therefore, the University of Idaho follows the guidelines set forth by the EPA as enforced and overseen by the Idaho Department of Environmental Quality (DEQ).

c. The Department of Transportation (DOT), in accordance with 49 CFR and by an EPA/DOT Memorandum of Understanding, regulates the safe transport of all hazardous, infectious, and radioactive materials. DOT regulations instruct shippers how to package, segregate, mark, label, and manifest hazardous materials/wastes for transport in commerce.

d. The University of Idaho must comply with all state and federal regulations, and with procedures set forth by the commercial treatment, storage, and disposal facilities accepting our waste for disposal.

100.40 University Facilities Located Outside of Moscow

a. University facilities located outside of Moscow are responsible for following the guidelines and procedures of this policy. Facilities will submit online disposal requests to Environmental Health and Safety (EHS). EHS personnel will coordinate the preparation, transportation, and disposal of hazardous materials generated at locations outside of Moscow.

b. University facilities located outside of Moscow are normally regulated as Very Small Quantity Generators (VSQG) because they typically do not generate more than 100 kg (220 lbs.) of hazardous waste in a calendar month, nor do they typically accumulate more than 1,000 kg of hazardous waste or 1 kg of acute hazardous waste at any given time. However, for a facility to attain VSQG status, it must track waste generation and accumulation each month and for the year. To assist facilities in attaining VSQG status, EHS developed an Excel spreadsheet that automatically tracks waste stream generation and accumulation. Contact EHS for a copy of this spreadsheet if you do not have it.

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PART 200 - HAZARDOUS WASTE DEFINITIONS

200.01 Environmental Protection Agency (EPA) Hazardous Waste Definitions

a. EPA regulations define two types of hazardous waste: characteristic and listed. A material is classified as characteristic waste if: 1) it is a discarded solid, liquid, or gaseous waste, and 2) meets one or more criteria of the four characteristic hazardous waste categories: ignitable, corrosive, reactive, and toxic.

b. EPA listed wastes fall into three different categories: non-specific source (e.g., spent solvents) which are denoted as "F" - listed waste; specific source (e.g., spent metal plating bath) which are denoted as "K" - listed waste; and discarded chemical products which are given the prefixes "U" or "P." The EPA provides extensive lists of hazardous materials listed as discarded chemical products, specific, and non-specific hazardous waste. "Discarded" refers to chemicals no longer desired due to contamination, expiration, process change or spill, etc.

   Soil, concrete, and other materials contaminated with hazardous materials may also be considered a hazardous waste. Contact Environmental Health and Safety for consultation before disposing of any potentially contaminated materials.

c. Environmental Waste – EHS uses the term "Environmental Waste" to include any waste material that is either a regulated waste (e.g., hazardous waste, universal waste, used oil, or PCB waste, etc.) or is a waste that is otherwise harmful to the environment or people but is not specifically included in the government environmental regulations.

200.10 EPA Criteria for Defining Characteristic Hazardous Wastes

a. Ignitable Waste (EPA Waste Code - D001) - A solid waste exhibits the characteristic of ignitability if a representative sample of the waste has any of the following properties:

   1. It is a liquid with a flash point of lower than 60°C (140°F).
   2. It is not a liquid and is capable, under standard temperature and pressure, of causing fire through friction, absorption of moisture or spontaneous chemical changes and, when ignited, burns so vigorously and persistently that it creates a hazard.
   3. It is an ignitable compressed gas.

4. It is an oxidizer.
   i. An oxidizer for the purpose of this subchapter is a substance such as a chlorate, permanganate, inorganic peroxide, or a nitrate, etc., which yields oxygen readily to stimulate the combustion of organic matter.

b. Corrosive Waste (EPA Waste Code - D002) - A solid waste exhibits the characteristic of corrosivity if a representative sample of the waste has either of the following properties:
   1. It is aqueous and has a pH lower than or equal to 2 or greater than or equal to 12.5, or
   2. A liquid that corrodes steel (SAE 1020) at a rate greater than 6.35 mm per year at 55^{o}C.

d. Reactive Waste (EPA Waste Code - D003) - A solid waste exhibits the characteristic of reactivity if a representative sample of the waste has any of the following properties:

   1. It is normally unstable and readily undergoes violent change without detonating.
   2. It reacts violently with water.
   3. It forms potentially explosive mixtures with water.
   4. When mixed with water, it generates toxic gases, vapors, or fumes in a quantity sufficient to present a danger to human health or the environment.
   5. It is a cyanide or sulfide-bearing waste which, when exposed to pH conditions between 2 and 12.5, can generate toxic gases, vapors, or fumes in a quantity sufficient to present a danger to human health or the environment.
   6. It is capable of detonation or explosive reaction if it is subjected to a strong initiating source or if heated under confinement.
   7. It is readily capable of detonation or explosive decomposition or reaction at standard temperature and pressure.
   8. It is a forbidden explosive as defined in 49 CFR 173.54, or is a Division 1.1, 1.2 or 1.3 explosive as defined in 49 CFR 173.50 and 173.53.

d. Toxicity Characteristic - A solid waste exhibits the characteristic of toxicity if it is a:
   1. Material listed in Table 1.
   2. Liquid (including solutions and mixtures) waste possessing a Table 1 material at a concentration greater than or equal to that material's regulatory level.
   3. Solid waste, which when subjected to the EPA Toxicity Characteristic Leaching Procedure (TCLP), yields a leachate with a Table 1 material at a concentration equaling or exceeding the regulatory limit listed for that material. Refer to Table 1.

Table 1: Maximum Concentration of Contaminants for the Toxicity Characteristic

EPA Hazardous Waste No.	Contaminant	Regulatory Level (mg/L)	EPA Hazardous Waste No.	Contaminant	Regulatory Level (mg/L)
D004	Arsenic	5.0	**D032**	Hexachlorobenzene	0.13
D005	Barium	100.0	**D033**	Hexachlorobutadiene	0.5
D018	Benzene	0.5	**D034**	Hexachloroethane	3.0
D006	Cadmium	1.0	**D008**	Lead	5.0

D019	Carbon tetrachloride	0.5	**D013**	Lindane	0.4
D020	Chlordane	0.03	**D009**	Mercury	0.2
D021	Chlorobenzene	100.0	**D014**	Methoxychlor	10.0
D022	Chloroform	6.0	**D035**	Methyl ethyl ketone	200.0
D007	Chromium	5.0	**D036**	Nitrobenzene	2.0
D023	o-Cresol	200.0	**D037**	Pentachlorophenol	100.0
D024	m-Cresol	200.0	**D038**	Pyridine	5.0
D025	p-Cresol	200.0	**D010**	Selenium	1.0
D026	Cresol	200.0	**D011**	Silver	5.0
D016	2,4-D	10.0	**D039**	Tetrachloroethylene	0.7
D027	1,4-Dichlorobenzene	7.5	**D015**	Toxaphene	0.5
D028	1,2-Dichloroethane	0.5	**D040**	Trichloroethylene	0.5
D029	1,1-Dichloroethylene	0.7	**D041**	2,4,5-Trichlorophenol	400.0
D030	2,4-Dinitrotoluene	0.13	**D042**	2,4,6-Trichlorophenol	2.0
D012	Endrin	0.02	**D017**	2,4,5-TP (Silvex)	1.0
D031	Heptachlor (& its epoxides)	0.008	**D043**	Vinyl chloride	0.2

NOTE: The above list of chemicals is subject to change without notice by the EPA. Contact EHS to make sure you have the most current information.

200.20 EPA Listed Hazardous Wastes

a. Non-Specific Source Hazardous Waste ("F"-Listed Wastes) - Non-specific source hazardous waste numbers are designated for generic waste streams such as spent solvents and unused chlorinated phenoxy pesticides.

NOTE: The F-listed waste stream definitions listed here are only an example of those most frequently generated at the University of Idaho. Contact EHS or refer to 40 CFR, Subpart D – Lists of Hazardous waste for more information pertaining to the other F-listed waste streams.

1. **Spent Solvents from Degreasing Operations (F001)** - Tetrachloroethylene, trichloroethylene, methylene chloride, 1,1,1-trichloroethane, carbon tetrachloride, and chlorinated fluorocarbons.
2. **Spent Halogenated Solvents (F002)** - Tetrachloroethylene, methylene chloride, trichloroethylene, 1,1,1-trichloroethane, chlorobenzene, 1,1,2-trichloro-1,2,2-trifluoroethane, o-dichlorobenzene, trichlorofluoromethane, and 1,1,2-trichloroethane.

3. **Spent Non-Halogenated Solvents (F003)** - Xylene, acetone, ethyl acetate, ethylbenzene, ethyl ether, methyl isobutyl ketone, n-butyl alcohol, cyclohexanone, and methanol.
4. **Spent Non-Halogenated Solvents (F004)** - Cresol and cresylic acid, and nitrobenzene.
5. **Spent Non-Halogenated Solvents (F005)** - Toluene, methyl ethyl ketone (MEK), carbon disulfide, isobutanol, pyridine, benzene, 2-ethoxyethanol, and 2-nitropropane.
6. **Discarded Unused Formulations Containing Tri-, Tetra- and Penta- Chlorinated Phenols and Derivatives thereof (F027)** - Tri-, tetra- and pentachlorophenols, 2,4,5-Trichlorophenoxy acetic acid (2,4,5-T), 2,4,5-Trichlorophenoxypropionic acid (2,4,5-TP or Silvex), and all salts, esters and amide derivatives. Also includes dibenzofurans and dibenzodioxins or any unused formulations or materials containing the same. F027 wastes are considered acute hazardous waste, subject to the one (1) liter storage limit.

b. Specific Source Hazardous Wastes ("K" - Listed Wastes) - Specific source hazardous waste numbers are designated primarily for industrial waste streams and are rarely given to university generated waste streams.

c. Discarded Chemical Products ("P" and "U" - Listed Wastes) – "P" - or "U" - listed wastes refer to discarded commercial chemical products, off-specification species, container residuals and spill residues of these chemical products.

1. **Acute Hazardous Wastes ("P"-Listed Wastes):** Chemicals considered to be acute hazardous waste are those listed with an alpha-numeric code starting with a "P" and are listed in Appendix A.

i. Empty Containers – The EPA requires that "Empty" containers that have contained acute hazardous ("P"-Listed) chemicals be triple rinsed before being disposed as normal trash, and the rinsates combined and submitted for disposal as a hazardous waste. However, EHS strongly recommends that the containers not be rinsed and submitted "as is" for proper disposal by EHS instead.

2. Toxic Wastes ("U"-Listed Wastes): These materials are given a "U" code and are listed in Appendix B.

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PART 300 – "NON-REGULATED," UNIVERSAL WASTES, AND MISCELLANEOUS HAZARDOUS MATERIALS

300.01 "Non-regulated" Discarded Chemicals

a. Certain materials failing to meet the EPA criteria of a characteristic or listed hazardous waste may still present a hazard to people and the environment. These materials may be carcinogenic or exhibit some degree of toxicity. One common example is ethidium bromide, which is a mutagen and potential carcinogen, but does not meet EPA hazardous waste criteria. Unless otherwise directed by EHS, all chemicals and chemical waste must be collected for evaluation and proper disposal by EHS as environmental waste.

300.10 Universal Waste

a. Universal waste refers to specific types of environmental waste common to most industry groups and facilities. The Environmental Protection Agency (EPA) established a program to allow less stringent requirements for managing these types of waste, with the primary goals of encouraging recycling and reducing illegal disposal of them as municipal waste. In Idaho, "universal waste" includes the following:

    1. **Aerosol Cans** – Commercially available aerosol cans are managed as universal waste.

        i. Aerosol cans should never be disposed of as normal trash, even if they are empty. Submit them to EHS or place them in a container labeled and regularly collected by EHS.
        ii. Never puncture aerosol cans.

    2. **Mercury Lamps** – Lamps that contain mercury. For example, fluorescent light tubes may contain sufficient mercury to meet the toxicity characteristic [see 200.10 (d)]. Included in this category are fluorescent tubes, compact fluorescent lights (CFLs), UV lamps, high intensity discharge (HID) lamps, neon lights, mercury vapor lamps, high pressure sodium (HPS) lamps, and metal halide lamps. Certain "green" fluorescent lamps manufactured to pass TCLP for mercury can be identified by their green end caps. Although these "green" lamps contain the same amount of mercury, they are designed to

pass the EPA TCLP test. As a result, the university has decided to recycle "green" lamps with those that do not pass TCLP testing.

i. Broken lamps are hazardous waste. Place them in containers that can be closed and submit them to EHS for disposal.

ii. **Lamps that are not Universal Waste** – Incandescent, halogen & LED lamps are **NOT** hazardous or universal waste and should be disposed in the normal trash or with the glass waste if made of glass.

3. **Batteries** – Certain batteries that exhibit a characteristic (e.g., ignitable, corrosive, reactive, or toxic) of hazardous waste must be managed as universal waste. Some examples include Ni-Cad, nickel metal hydride (NiMH), lithium and lithium ion (e.g., laptop computer batteries), mercuric oxide, and silver oxide batteries.

   i. Lead-acid batteries, such as vehicle batteries and sealed lead-acid batteries in emergency lights and some uninterruptable power supplies, are exempt from most of the hazardous waste regulations provided they are sent for regeneration AND are not leaking. Also see 300.15 below.

   ii. **Non-Hazardous Waste Batteries** – Alkaline, zinc-carbon air, and zinc chloride batteries are **NOT** hazardous/universal wastes and should be disposed in the normal trash.

4. **Mercury-containing equipment (MCE)** – Devices (other than lamps) that contain elemental mercury such as:

   i. Thermometers
   ii. Thermostats
   iii. Manometers
   iv. Relay switches
   v. Blood pressure cuffs

   NOTE: never dismantle MCE; any broken MCE that have released their mercury are hazardous waste and must be placed into an airtight container and submitted to EHS for collection.

5. **Pesticides** – Insecticides, herbicides, bactericides, and parasiticides, etc., that meet one of the definitions below:

   i. Recalled pesticides.
   ii. Discarded pesticides determined to be hazardous waste.
   iii. Stocks of unused pesticides that are gathered and managed as part of a waste pesticide collection program.

b. All universal waste must be managed in a way that prevents leakage, spillage, or damage.

c. All universal waste must be dated when discarded (i.e., when the decision is made to dispose of the item).

d. All universal waste must be properly labeled with the wording "**Universal Waste – Aerosol**," "**Universal Waste – Lamps**," "**Universal Waste – Batteries**," "**Universal Waste – Mercury Containing Equipment**," or "**Universal Waste – Pesticides**," as appropriate.

e. Universal waste may be accumulated for no longer than one year.

f. When universal wastes are shipped off-campus, they must be sent to another universal waste handler or a destination facility (a facility that treats, disposes, or recycles universal waste).

g. Refer to 400.80 for specific universal waste disposal procedures.

300.12 Cathode Ray Tubes (CRTs)

a. Cathode Ray Tubes (CRTs) are not universal waste. Under EPA regulations, a CRT is defined as a vacuum tube, composed primarily of glass, which is the visual or video display component of an electronic device. A used, intact CRT means a CRT whose vacuum has not been released. A used, broken CRT means that the glass has been removed from its housing or casing whose vacuum has been released.

b. Used, intact CRTs, if recycled, are not otherwise regulated for disposal.

c. Used, broken CRTs, if recycled, must meet the following requirements.

    1. They must be stored in a building with a roof, floor and walls or placed in a container that is constructed, filled, and closed to minimize releases of CRT glass to the environment.

    2. The container must be labeled "Used cathode ray tube(s) – contains leaded glass" **and** "Do not mix with other glass materials."

    3. They must be transported in a container that meets the above requirements.

d. If used CRTs, either intact or broken, are NOT recycled, a determination must be made to see if the CRT meets the definition of hazardous waste.

e. Recycle all CRTs through the Facilities Services Recycling/Surplus/Solid Waste Division.

300.13 Electronic Equipment

a. Electronic Waste (E-Waste) includes such items as non-CRT video display terminals, computers, printers, copiers, scanners, certain laboratory equipment, and printed circuit boards.

b. E-Waste is not universal waste.

c. If E-Waste is sent to a recycler, it is exempt from EPA regulatory requirements.

d. Whole circuit boards are not regulated if sent for reclamation.

e. All E-Waste must be recycled through the Facilities Services Recycling/Surplus/Solid Waste Division.

f. **Laboratory Instrumentation** – Computerized lab equipment must be cleaned of chemical residue, have all chemical reagents removed and a completed EHS evaluation form (i.e., EHS must receive the completed form and the instrument must pass an inspection by EHS) before submitting it to Facilities for recycling.

300.15 Spent Lead-Acid Batteries

a. Lead-acid batteries include automotive, marine, and lawn equipment batteries, as well as other sources. Sealed lead-acid batteries are commonly found in emergency lighting, fire and security alarm panels, and uninterruptible power supplies (UPSs).

b. To the extent possible, the University of Idaho manages spent lead-acid batteries as hazardous waste exempt from most RCRA management requirements under 40 CFR Part 266, Subpart G. If the batteries are sent for regeneration (i.e., recharging or replacement of the electrolyte), the only requirement is that a hazardous waste determination is made. If the batteries are sent for reclamation (e.g., breaking, cracking, smelting to recover metal values), a one-time Land Disposal Restriction (LDR) notification must be completed.

c. Leaking spent lead-acid batteries must be managed as hazardous waste (i.e., it is subject to regulatory requirements).

d. Refer to 400.70 for specific lead-acid battery disposal procedures.

300.20 Used Oil

a. Used oil is defined by the EPA as any oil that has been refined from crude oil, or any synthetic oil, which has been used and because of such use is contaminated by physical or chemical impurities. Used oil is regulated by the EPA but is not considered hazardous waste unless it is mixed with a listed hazardous waste. Used oil is managed by EHS personnel and is subject to this policy. *Please see 400.60 - Used Oil Disposal Procedures.*

300.25 Antifreeze

a. Given the physical properties of ethylene glycol, unused antifreeze is typically not ignitable, corrosive, or reactive, nor does it contain one of the forty toxicity characteristic constituents; and is not a P-listed or U-listed waste. Consequently, unused antifreeze is not a hazardous waste though it is still to be submitted for disposal through EHS.

b. On the other hand, used antifreeze may be a hazardous waste due to lead or other heavy metal content picked up from the radiator. When drained from radiators, antifreeze may be commingled in a single container, such as a 30-gallon drum, before being collected by EHS to be recycled.

c. Keep used antifreeze separated by type (e.g., ethylene glycol and propylene glycol); and DO NOT mix used antifreeze with used oil or any other vehicle fluids, since this severely limits recycling options and may require it to be disposed of as hazardous waste rather than being recycled.

d. Submit all antifreezes for collection by Environmental Health and Safety.

300.30 Unknown Materials

a. The generation of unknown materials suggests a need to improve hazardous materials and laboratory management. Because their hazardous characteristics are not known, additional cost, liability, and time are associated with the proper disposal of unknown materials.

b. Unknown materials will be accepted by EHS personnel on a charge back basis. Analytical and other costs associated with identification, characterization and the disposal of unknown materials will be charged to the department or other party that is responsible for generating them.

300.40 Compressed Gas Cylinders (e.g., Lecture Bottles)

a. Whenever possible, unwanted compressed gas cylinders still under pressure should be returned to the vendor from which they were purchased (see Part 700 - Transporting Hazardous Materials). If the vendor will not accept the cylinder(s) back, submit them to EHS for disposal. “Empty” cylinders should have their valves removed, be rinsed thoroughly with an appropriate solvent, have any labels obliterated, and be disposed of as normal trash or recycled.

300.45 Aerosol Cans

a. All aerosol cans (even if empty) must be submitted to Environmental Health and Safety for disposal as universal waste. Never puncture aerosol cans.

300.50 Controlled Substances

a. Controlled substances include barbitals, amphetamines, chloral hydrate and precursor chemicals that can only be obtained with a valid Drug Enforcement Agency (DEA) license. The disposal of these materials is strictly regulated and must be done under the guidelines set forth by the Idaho Board of Pharmacy and DEA. If the controlled substance does not meet the definition of an EPA hazardous waste, it can be incinerated by the individual possessing the drug if they have a valid DEA license. Drugs purchased prior to being regulated by the DEA are referred to as "legacy drugs" and can be collected and disposed of by EHS through the Office of Research Assurance. Also, controlled substances cannot be transferred from one DEA License to another.

   NOTE: Always keep controlled substances under lock and key for liability and safety reasons.

300.60 Photography and Darkroom Chemicals

a. Developers, replenishers, and fixers tend to be toxic and/or corrosive. Submit these hazardous materials to EHS for disposal purposes when spent or no longer needed (never discard these materials to the sanitary sewer system or as normal trash). Some photography labs have a silver recovery unit (SRU) to retrieve silver before waste solutions are discarded. If your process does not have an SRU, you will need to accumulate the waste and submit it for disposal to EHS. Silver recovery units serviced by a contract must meet EPA regulations for the recovery of precious metals. For more information on SRUs, contact EHS at 208-885-6524.

300.70 Hazardous Household and Commercial Commodities

a. A household or commercial commodity is a material that is packaged and distributed for sale through retail or wholesale businesses for consumption by individuals, businesses, or households. Examples include cleaners, disinfectants, lubricants, paints, thinners, degreasers, pesticides, and fertilizers that are sold over the counter in local stores and from mail order businesses. Many of these materials are considered hazardous yet they are readily available to all consumers.

   Submit hazardous household and commercial products to EHS for disposal. EHS will only accept products that were purchased with University of Idaho funds and are intended for use as part of university business. Products that were purchased for personal use can be disposed of at the Latah County Solid Waste Processing Facility located on the Troy highway.

Hazardous Materials Management & Disposal

Policy & Procedures Manual

PART 400 - HAZARDOUS MATERIALS DISPOSAL PROCEDURES

400.01 General

a. Following the procedures in this section will help ensure that containers of hazardous materials are properly labeled, containerized, and stored according to state and federal hazardous waste regulations. These procedures will also help expedite the safe collection and disposal of hazardous materials by EHS personnel.

b. There are several basic steps and regulations that all individuals must follow to properly and safely handle, store, and dispose of hazardous materials generated in their work area:

   1. First, assess whether processes that use hazardous materials can be eliminated or replaced with alternative methods that do not involve hazardous substances.

   2. Attempt to minimize the quantity, toxicity or other hazardous characteristics of materials produced by processes that cannot be eliminated or substituted with more environmentally safe alternatives.

   3. Evaluate the hazardous materials characteristics to ensure that incompatible materials are not combined in the same container nor stored near one another.

   4. Evaluate the hazardous materials in use to ensure that waste with restricted disposal options is not combined with other non-restricted waste; this increases the amount of waste having restricted disposal options.

   5. Do **NOT** dispose of hazardous materials in the sanitary sewer system, atmosphere (i.e., evaporation), or solid trash receptacles (please see Part 400.05 - Unacceptable Hazardous Materials Management Practices). Submit all chemical waste to EHS for evaluation.

   6. Ensure all chemicals, including waste containers, are properly labeled.

   7. Ensure that adequate containers are available to accumulate each waste stream in advance of conducting research, analyzing samples, or starting a chemical process.

8. Properly label **ALL** containers for accumulating waste with a completed EHS Avery 5164 – Hazardous Waste Label.

9. Store liquid waste bottles in compatible, EPA approved containment in a safe location away from sink or floor drains and out of aisles.

10. Clean up all spills immediately and submit cleanup waste to EHS for disposal.

11. Track accumulations to the container (i.e., the quantity of all accumulations along with their constituents and concentrations) on a log sheet if accumulating varying quantities having varying constituents in the container. A logbook with entries referenced to unique container numbers is important.

12. Containers must **ALWAYS** be kept closed except when adding or removing waste.

13. Minimize the accumulation of hazardous materials in your area by submitting materials and full containers promptly to EHS for disposal. Never accumulate more than 55 gallons of hazardous materials or one (1) liter of acute hazardous waste in a Satellite Accumulation Area (SAA).

14. Submit all chemicals and hazardous materials to EHS for final evaluation, collection, and proper disposal.

400.05 Unacceptable Hazardous Materials Management Practices

a. There are several management practices that are **NOT** acceptable under the EPA and state DEQ regulations. These management practices are illegal and could make the university susceptible to violations, fines, and other liabilities.

    1. **Disposal** - The disposal of hazardous wastes to the sanitary sewer system, a solid waste receptacle, or directly to the environment (***including evaporation***) is illegal. EPA regulations require that generators determine (either by knowledge or through chemical analysis) whether a material is a hazardous waste before it is discarded. Final waste determinations **MUST** be made by EHS.

    2. **Transport** - Do not deliver discarded hazardous materials to the EHS office, either in person or via campus mail. Deliveries of these materials to the Hazardous Materials Storage Building (HMSB) or Facilities Recycling are also unauthorized. These materials will be returned to the individual and will not be accepted for collection until proper protocols have been followed.

    3. **Treatment** - Treating hazardous waste to reduce its toxicity or make it less reactive without an EPA permit and/or a “waste analysis plan” is a violation of EPA regulations.

Treatment includes, but is not limited to, heavy metal precipitation and oxidation/reduction.

4. **Waste Stream Dilution/Evaporation** - The dilution or evaporation of hazardous waste to lessen its toxicity or flammability is not permitted by the EPA. Hazardous wastes containing characteristic waste constituents above TCLP regulatory levels cannot be diluted or evaporated down to below regulatory levels and disposed of to the sanitary sewer system. (e.g., a 2 mg/L mercury solution cannot be diluted to below 0.2 mg/L and discarded to the sewer system for disposal. Also, a material containing benzene CANNOT be allowed to evaporate to achieve benzene concentrations below regulatory levels).

5. **Storage** - Storing more than 55 gallons of hazardous waste and/or one kilogram of acute hazardous waste (P-listed waste) in each storage area is not allowed. Removing waste from one room or building to another room or building without approval from EHS personnel is also not allowed. Hazardous materials must always be stored in a physically sound and chemically compatible closed container (see (1) above) that is always kept closed between accumulations and during storage.

400.10 Special Accumulation and Packaging Instructions

a. Due to reactivity, toxicity, and disposal restrictions, certain materials can only be accumulated in certain size containers, or packaged to prevent exposure to water or air, and/or reduce a potentially violent reaction. **Table 2** lists hazardous materials with certain stipulations that must be followed to facilitate their collection and disposal.

Table 2: Waste Accumulation Restrictions

Waste	Restrictions	Hazard(s)	Comments
DOT Poison Inhalation Hazard (PIH) materials (e.g., Iodomethane)	1L max	Extremely toxic and or reactive. Do not mix with other waste, even if compatible	Check section 14 of material's SDS for classification as a DOT PIH material. Call EHS at 208-885-6524 if not sure
Perchloric acid	4L max, must be packed alone	Perchloric acid, besides being corrosive, can form shock sensitive compounds with organics and metals	Heat sensitive (Perchloric acid becomes explosive if heated to its boiling point). Must be packed separately
Perchlorate salts	19L size max	Perchlorate salts should not be mixed with organics	Can be shock sensitive. Strong oxidizer; must be packed by themselves

Picric acid	19L size max	Toxic. Potentially explosive, always keep wet. Metal salts can be shock sensitive. Heat sensitive	Keep wet, protect from contamination and store in a cool location
2,4-Dinitrophenyl-hydrazine	4L max	Potentially explosive	Incompatible with strong acids & oxidizers
Inorganic cyanides	19L max	React with acids emitting highly toxic hydrogen cyanide gas	Most are DOT PG I Toxic materials that must be shipped by themselves
Sodium azide	19L max for sodium azide contaminated waste	Very toxic & Shock sensitive Heating may cause an explosion! Incompatible with metals, acids & oxidizers	Take care not to contaminate and never use a metal spatula to dispense. Store in a cool location
PG I-Toxic materials (not PIH)	19L	Very toxic. Do not mix with other waste even if compatible.	Cannot be packed with other waste. (e.g., Phenylthourea (PTU), Sodium cyanide). Call EHS at 208-885-6524 if not sure. Check section 14 of SDS
Ethers (e.g., Diethyl ether, tetrahydrofuran, dioxane, etc.)	19L max	Form peroxides over time. Peroxide buildup leads to shock sensitivity and increased flammability over time.	
Hydrofluoric acid	4L max	***Fatal if swallowed, in contact with skin or if inhaled***	Must be packed separately
Ammonium nitrate	4L max	Strong oxidizer	Must be packed separately

400.20 Hazardous Materials Container Selection

a. Properly preparing hazardous materials will help facilitate their safe and expedient collection and disposal by EHS personnel and meet applicable state and federal regulations.

1. **Proper Containers** - A proper container is one that has retained its integrity and can be sealed tightly. Containers should be resistant to chemical degradation and corrosion. Liquids must be stored in containers designed for liquids, NOT solids.

2. **Unacceptable Containers** - The following containers are NOT acceptable for materials storage and disposal: beakers; test tubes; Erlenmeyer, filter, volumetric, round bottom, and other flasks; Petri and weighing dishes; nor food, drink, and beverage containers (e.g., coffee cans and jars; milk and juice containers). Only containers manufactured for the purpose of holding hazardous materials can be used for the containment of hazardous materials. Unused hazardous materials still in their original containers are acceptable, but only if the container has retained its integrity. Also note the following:

    i. Openings - Containers must NOT have a spigot (e.g., carboy), valve, or other opening in addition to the main opening on top.

    ii. Plastic Bags - Plastic bags are NOT acceptable as primary containers for the containment or storage of hazardous materials or wastes. They can only serve as secondary containment. Plastic bags can never be used to contain sharps (see (v) below).

    iii. Liquids - Use containers designed to hold liquids (e.g., wide mouth containers that were manufactured for solids should not be used for the containment of liquid waste).

    iv. Solids - Containers holding solids must be capable of forming a tight seal. Material in containers that cannot form a tight seal must be transferred into a new container that can or be over-packed in another proper container.

    v. Sharps - Sharps (e.g., needles, broken glass, wire, razor blades, etc.) must be contained in strong, tight, puncture-proof containers. Plastic bags are NOT acceptable for sharps.

    vi. Gas Cylinders - Gas cylinders must have their valve protection caps included for disposal purposes. Leaking cylinders will NOT be collected by EHS personnel; they must be evaluated for safe disposal options. Contact EHS if you discover a leaking cylinder.

3. **Container Size** - Plastic and metal containers up to five gallons in size, and glass containers up to one gallon in size are acceptable for routine liquid and solid hazardous materials collection and disposal. Larger sized (e.g., drums and barrels, etc.) containers require PRIOR approval from EHS personnel BEFORE using it to contain hazardous materials.

4. **Container Condition** - Containers must NOT be warped, cracked, or leaking. They must NOT have degraded/corroded from the material(s) they contain or otherwise pose a threat to lose their contents. Note the following:

    i. Closures - Containers containing liquids must have screw cap closures that form a tight seal. Stoppers, septums, wax paper, etc., are **NOT** acceptable as closures and

such containers will **NOT** be collected until the contents have been transferred to a proper container.

ii. Surface Contamination - All containers must be relatively void of chemical residue on the surface. Contaminated or excessively dirty waste containers will not be collected for disposal until cleaned.

5. **Container Type** - The list below provides guidelines to follow when choosing a container for hazardous materials storage:

i. Mineral Bases - Sodium hydroxide, etc., are best stored in glass or plastic containers without glass stoppers.

ii. Mineral Acids - Hydrochloric acid, sulfuric acid, etc., are best stored in glass or heavy plastic containers, depending on the material's compatibility with glass and plastic. **Exception:** hydrofluoric (HF) acid, which attacks glass, must be collected and stored in plastic containers.

iii. Chlorinated Organic Solvents - Methylene chloride, chloroform, etc., are best stored in glass containers.

iv. Polar Organic Solvents - Acetone, ethanol, etc., are ideally stored in glass or metal containers. However, plastic may be acceptable for short term storage.

v. Non-polar, Non-chlorinated Organic Solvents - Hexanes, ethyl ether, benzene, etc., are best stored in glass or metal containers. Avoid plastic containers.

vi. Organic Peroxides - Benzoyl peroxide, etc., are usually stored in plastic containers. Check the manufacturer's recommendations for the specific material you are using.

vii. Oxidizers - Potassium permanganate, sodium nitrate, bleach, etc., are best stored in glass containers.

NOTE: Avoid containers with metal caps for the containment of corrosive materials.

Many waste streams and hazardous materials will have mixtures of the above wastes, when in doubt use glass containers.

6. **Empty Reagent Containers** - Empty reagent containers should be rinsed thoroughly before being reused or discarded. Follow the procedures below to prepare "empty" reagent containers for reuse or disposal:

NOTE: Do not rinse P-listed (acute) waste containers. Submit them unrinsed to EHS for disposal.

i. Preparing empty reagent bottles:

a) For organic reagents:

1) Rinse containers first with acetone or other appropriate solvent (these rinsates will most likely be hazardous waste and must be submitted to EHS for disposal).

2) Rinse with water if acetone was used in step one (1), or rinse with acetone and then water if a different organic solvent was used [combine with rinsates from step one (1)].

3) Allow the container to thoroughly drain into the waste collection container for the rinsates. The reagent container is thoroughly drained when rinsate ceases dripping from the inverted container.

4) Air dry the reagent container.

b) For inorganic reagents:

1) Rinse container thoroughly with water (or appropriate solvent) followed by acetone and then again with water (submit rinsates for disposal).

2) Allow the container to thoroughly drain into the waste collection container for the rinsates. The reagent container is thoroughly drained when rinsate ceases dripping from the inverted container.

3) Air dry the container.

c) If chemical residue is still evident, repeat the steps above.

d) Deface the label and other markings on the original container.

e) Reuse for waste containment, discard as normal trash, or donate to EHS personnel.

7. **Empty Lecture Bottles and Gas Cylinders** - The disposal of empty lecture bottles and small non-returnable gas cylinders should be carried out as follows:

i. Make sure the cylinder is empty (atmospheric pressure).
ii. Remove the valve.
iii. Rinse cylinders out with an appropriate solvent, collecting the rinsate as a hazardous waste.
iv. Air dry.

v. Deface the label(s) and other markings.
vi. Recycle the metal.

400.30 Accumulation and Storage

a. Proper accumulation and storage of hazardous materials will be determined by the material's toxicity, physical and chemical characteristics, space availability, and convenience. Space availability and convenience factors should not dictate storage locations at the expense of safety.

1. **Container Markings** – Completely deface any existing label on waste collection containers. Properly label and identify the contents of each container before accumulation begins. DO NOT date the container.

i. Adequate Chemical Descriptions - Example, use *"potassium permanganate"* instead of just *"permanganate,"* or *"lead nitrate"* instead of just *"Pb^{+2}"*; do not use acronyms, chemical formulas, etc.

ii. Constituent Concentrations - Note the concentrations for each constituent in percent (%) or parts per million (ppm) and the total quantity of each addition to the container to calculate final concentrations of each constituent in the material.

2. **Accumulation** - All containers must remain closed between accumulations (e.g., an open container with a funnel resting in its mouth is not considered closed by EPA regulations).

3. **Storage** - Choose a safe location to store the container for accumulation purposes.

i. Location - Waste must be stored within the same area, laboratory, or room in which it was generated.

ii. Quantity Limitations - No more than 55 gallons of hazardous waste or one (1) liter of acute hazardous waste can be accumulated in any one area.

iii. Secondary containment - Use secondary containment, such as a small plastic tub, to hold the waste containers. Segregate by compatibility groups (see Section 620.10).

4. **Full Containers** - When the container is full (leave room for expansion), calculate the concentrations for all constituents.

5. **Disposal Request** - Complete an online waste disposal request for the container as soon as possible.

400.40 Chemical Waste Disposal Request Completion Procedures

a. Departmental offices must have computer access to the online waste disposal request system. Instructions are available on the Environmental Health and Safety website where disposal requests are completed. Below are guidelines that will aid in completing the request and expediting the collection process.

    1. Carefully enter each request to avoid errors.
    2. Fill out one request for each container unless instructed otherwise by EHS personnel.
    3. Small vials and bottles should be placed in a re-closeable plastic bag and the form label attached to the bag.
    4. If disposing of a stock bottle of chemicals, do not obscure a container's original label.

b. Any of the common web browsers may be used for entering a chemical waste collection request. The request form is available on the EHS website.

    1. Log in with your myUI username and password.

    2. Complete the Chemical Waste Collection Request form.

    3. Review the information you have entered. If necessary, you may edit the entries. If it is correct, click the **Submit Request** button and a confirmation message will appear. Click **OK** or **Cancel** as appropriate.

       NOTE: The system performs some error checking and displays an asterisk next to the field that requires correction; a message appears just above the Generator Information block to explain what action you must take.

    4. A new page will appear with the instruction "Please print the label below and attach to the container." Select the highlighted **Print** button and a new window will open for printing the label.

       IMPORTANT: This label is specific to the container for which you entered the information. You must submit a new request and print a new label for each container.

    5. Close the print window.

    6. You will now have three (3) options:

        i. **Log Out** to exit the Chemical Waste Collection Request system.

        ii. **Submit another request** for different waste material.

iii. **Submit another request for an identical container**, which allows you to submit another waste container with a waste composition similar or identical to the one previously submitted. Edit the new entry, as necessary.

7. Check your e-mail inbox for a receipt of your waste collection request. Though not the preferred method, you may print a copy of the e-mail receipt to use as a label if you forget to print the label immediately after submitting the request.

   REMEMBER: The Chemical Waste Collection Request system will accept only one container per request. Additional containers require additional requests.

8. If you do not receive an email notification for your submittal, your request did not go through and EHS will not know to pick up your container. If additional attempts are unsuccessful, contact EHS for assistance.

400.50 Hazardous Materials Collection by EHS

a. Hazardous materials will not be collected prior to EHS personnel receiving completed chemical waste collection requests. EHS makes every effort to collect the waste in a timely manner, dependent on the hazardous characteristics of the material and the likelihood of consolidating similar materials for cost-effective, off-campus shipment.

400.55 Hazardous Waste Inventory

a. Annually, individuals using hazardous materials and generating chemical wastes will be required to complete an inventory of waste streams not yet submitted to EHS as collection requests. Inventories will be used to meet the Idaho DEQ requirement of periodically reporting all hazardous waste that is generated. Normally, the reporting cycle is each January. The inventory includes waste being accumulated but not yet submitted to EHS for disposal purposes. Unused discarded chemical products (i.e., chemicals still in their original containers) do not need to be reported to EHS.

400.60 Used Oil Disposal Procedures

a. Individual generators will not dispose of used motor oil by draining or pouring oil into the sanitary sewer or storm drain systems, a sump, or onto the ground/road. Used oil can only be offered to EHS for off-site shipment. Only used engine oil (including synthetic oil), hydraulic oil, transmission oil, and other oils approved by EHS are to be accumulated in drums provided by EHS and labeled "USED OIL." These oils may be combined into the same drum. Antifreeze, refrigerant oil, vacuum pump oil, brake fluid, paint and paint thinners, parts cleaners, and other solvents are not to be added or mixed with used oil (or each other). Accumulate these materials separately and submit them to EHS for disposal as hazardous materials. Used oil is **not** to be collected in an underground or aboveground storage tank without prior EHS permission.

1. **Accumulation of Used Oil** - Collect used oil in drums stored in a location protected from the weather. Drums must be labeled "USED OIL" and are supplied by EHS. Do not mix any other materials with the used oil.

   i. Collection Containers - Initially, individual generators will be provided with a 30-gallon drum for collecting and storing used motor oil. Smaller containers may be provided as appropriate.

   ii. Containers must be kept in good condition and not leak.

   iii. Collection and Disposal of Full Drums/Other Containers - Submit a collection request using the online Chemical Waste Collection Request system. On the submittal form, under Chemical Name/Constituents, describe the material as "Used oil."

   NOTE: Drums must not be overfilled, and surfaces must be clean of oil.

2. **Oil Filter Disposal**

   i. Filter Removal - Remove filters from engines at operating temperature. "Hot drain" the oil from the filter by puncturing either the anti-drain back valve or the filter dome and drain for 12 hours. A filter is drained when it no longer drips any oil.

   ii. Filter Disposal - Discard drained filters (as previously described) in container provided by EHS; contact EHS if you need a container.

   NOTE: For the management and disposal of other automotive fluids, oils, or parts cleaner fluids not mentioned in this section, please contact EHS.

400.70 Lead-acid Battery Recycling/Disposal

a. Non-leaking automotive, marine, tractor, and other lead-acid batteries, including sealed lead-acid batteries, will be managed by the Facilities Services Surplus/Recycling/Solid Waste Division. Call 208-885-2091 for additional information.

b. Leaking lead-acid batteries must be placed in a plastic container such as a tub or 5-gallon pail. Submit a Chemical Waste Collection Request for disposal through EHS.

400.80 Universal Waste Handling Procedures

a. **Lamps** – Mercury containing lamps are managed by both EHS and the Facilities Recycling and Solid Waste Department.

1. Custodial Staff – Place used lamps in a container provided by EHS (contact EHS or your supervisor for locations of containers) in your area and make sure it is closed. These containers are labeled and collected by EHS twice a year (usually around April and October). If the container becomes full, contact EHS at 208-885-6524 or safety@uidaho.edu to report it to the Hazardous Materials Group.

    i. Do not place light ballasts, aerosol cans, broken lamps, or trash in these containers.

    ii. Do not place small lamps (e.g., Compact Fluorescent Lamps (CFLs) in the taller (4') containers. EHS provides smaller containers for them.

2. Laboratory and other Employees – Submit universal waste lamps to EHS using the Chemical Collection Request application found on the EHS website.

    i. Place lamps to be discarded in a box or other container that can be closed. The original box the lamps came in is a good choice.

    ii. Keep the box closed except when adding lamps.

    iii. Mark on the box "Universal Waste – Lamps."

    iv. Mark on the box with the date you placed the lamp in it (e.g., Universal Waste – Lamps (mm/dd/yyyy).

    v. Submit lamp to EHS using the Chemical Collection Request application on the EHS website.

b. **Broken Lamps** – broken lamps are managed as hazardous waste. Carefully clean up the lamps using the following procedure:

1. This procedure is applicable to situations where only one lamp is broken. In all other situations, leave and secure the area, and contact Environmental Health and Safety, 208-885-6524.
2. Wearing gloves, carefully pick up or scoop up the glass fragments and powder with a stiff piece of paper or cardboard (avoid quick movements which will stir up dust).
3. Use sticky tape (e.g., duct tape) to pick up remaining fragments and/or powder.
4. If it is a hard surface, wipe the area clean with a wet paper towel.

Place all items in a plastic bag, seal the bag, then put the bag in a strong, airtight container such as a 5-gallon plastic pail. Mark on the pail "Hazardous Waste – Broken Lamps."

Submit a Chemical Waste Collection Request to EHS.

c. **Batteries.**

1. Segregate batteries by type:

    i. Alkaline, Zinc chloride, Zinc-Carbon Air – dispose in normal trash.

    ii. Lead-Acid – Manage in accordance with 400.70 above.

iii. Lithium and Lithium ion – Manage as universal waste.

iv. All others including Ni-Cad, NiMH, mercuric oxide, silver oxide, button cell batteries, and other rechargeable type batteries – manage as universal waste.

2. Tape the electrodes on universal waste batteries or place each battery in a re-sealable plastic bag.
3. Place the taped or bagged universal waste batteries in a box or other container.
4. Mark on the box or container "Universal Waste – Batteries."
5. Mark on the box or container the date you placed the first battery in it.
6. Submit the batteries to EHS using the Chemical Collection Request (CCR) application on the EHS website.
7. If a universal waste battery shows any evidence of leakage, spillage, or damage, follow the steps above except that you must place the battery in a re-sealable bag, then in a compatible, appropriate-sized container and submit it to EHS for disposal. Follow the instructions in 400.40 for completing a Chemical Waste Collection Request.

d. **Mercury-Containing Equipment (MCE).**

1. Do not remove mercury ampules from MCE.
2. Place the MCE in a re-sealable plastic bag.
3. Mark the bag "Universal Waste – Mercury Containing Equipment."
4. Mark the date on the bag when you decided to discard the MCE.
5. Submit all MCE to EHS for recycling/disposal.
6. If an MCE is broken, leave and secure the area and contact EHS at 208 885-6524.

e. **Pesticides**.

1. The Idaho Department of Agriculture (ISDA) sponsors a pesticide collection day as part of its Pesticide Disposal Program. Collection sites are located at several sites in the state of Idaho. EHS will send notice to the campus community, including facilities located outside of Moscow, in advance of these collection days.

   NOTE: For very small quantity generators (VSQG) located throughout the state, transport pesticides to the ISDA collection location nearest to the facility. Provide EHS with a copy of the receipt and an inventory of the pesticides delivered to the ISDA.

2. Stocks of unused pesticides, including dilutions and rinsates, are acceptable.
3. If you have stocks of recalled pesticides, contact EHS at (208) 885-6524 as soon as you are aware that the pesticide has been suspended or canceled.

4. If the pesticide container is structurally sound, securely close it. Opened bags or boxes of pesticides should be taped closed.
5. If the pesticide container is not structurally sound (e.g., tears in bags or boxes, degraded plastic bottles, etc.), place it in an intact container that does not leak and can be sealed airtight.
6. Mark on the container "Universal Waste – Pesticide."
7. Mark on the container the date when you decided to discard the pesticide.
8. Submit all pesticides to EHS for recycling/disposal.

400.90 Hazardous Household/Consumer Commodities Disposal Procedures

a. Preparation for Disposal - Many cleaners, solvents, lubricants, paints, degreasers, etc., sold under a trade name are hazardous materials and must be disposed of properly. Household hazardous materials submitted for disposal must be accompanied by a current Safety Data Sheet (SDS) for that product.

b. How to Obtain an SDS - SDSs can be obtained through the vendor or manufacturer of a given product or contact EHS for assistance. Most SDSs are now available online.

c. EHS will only accept materials that were purchased for University of Idaho business. Products that were purchased for personal use can be disposed of at the Latah County Solid Waste Processing Facility.

Hazardous Materials Management & Disposal

Policy & Procedures Manual

PART 500 - HAZARDOUS WASTE MINIMIZATION PRACTICES

500.01 General

a. Reducing the quantity of hazardous waste generated by the university helps protect the environment, saves money on hazardous materials disposal costs, minimizes liability, and reduces regulatory requirements of the university. Hazardous waste minimization involves various strategies to reduce the consumption and/or toxicity of hazardous materials used by the university.

500.10 Legal Requirements

a. The Hazardous and Solid Waste Amendments (HSWA) to the Resource Conservation and Recovery Act (RCRA) in 1984 mandates that all generators of hazardous waste have a waste minimization plan in action. Large quantity generators (like U of I) of hazardous waste are also required to demonstrate that they are making efforts to minimize the quantity or toxicity of hazardous waste generated at their facility. This policy serves as a formal hazardous waste minimization plan for the University of Idaho.

500.20 Hazardous Waste Minimization Methods

a. Source Reductions - Source reductions involve reducing the quantities of hazardous waste generated by substituting, reducing, and/or eliminating hazardous materials used in a process. This also includes eliminating processes that generate hazardous waste altogether.

    1. **Chemical Substitution** - Every attempt should be made to find substitutions for hazardous materials in a process to render its waste as nonhazardous (e.g., substituting copper sulfate for mercuric oxide in Kjeldahl analyses making neutralization and waste disposal to the sanitary sewer system possible). Contact EHS personnel for assistance in chemical substitution.

i. Mercury Thermometers - Whenever possible, mercury thermometers should be replaced with alcohol or other types of thermometers. Extra care should be taken to avoid breaking mercury thermometers and other instruments using mercury.

2. **Quantity Reduction** - Chemical processes which cannot be eliminated or in which chemical substitution is not a viable solution to minimize hazardous waste generation, should be scaled down to reduce quantities of materials used and wastes produced. This practice conserves chemicals along with minimizing the quantity of hazardous waste generated.

3. **Eliminate Processes Using Hazardous Materials** - Hazardous waste reduction can be achieved by using computers, models and/or instrumentation to achieve the same results without generating hazardous waste (e.g., analytical combustion analysis eliminated Kjeldahl wet chemistry analyses for the determination of total nitrogen in plant samples).

b. Recycling - Many solvents (e.g., chloroform, hexanes, and methanol) can be recycled. Every attempt should be made to recycle these solvents, especially if large volumes are used.

CAUTION: distilling solvents can be dangerous. Consult EHS before attempting any solvent recycling. Metallic (liquid) mercury can also be recycled. Solids are more difficult to recycle, but all efforts should be made to recycle them.

c. Chemical Surplusing - Surplusing discarded chemical reagents, many which have not been opened, helps to reduce duplicate purchase and disposal of chemicals. The redistribution of surplus chemicals to teaching, service, and research labs dramatically reduces hazardous waste generation. EHS will periodically circulate a list of surplused chemicals to departments and ChemStoress. Surplused chemicals can be claimed for university use on a first-come, first-serve basis at little or no cost. Interested parties should contact EHS or ChemStores for the availability of surplus chemicals.

d. Hazardous Materials Acquisition - Purchase hazardous materials in small quantities to eliminate the disposal of large quantities of outdated, unused materials later. If a large quantity of a material is purchased to save money, seek others interested in the same material for a joint purchase. This method of waste reduction especially applies to readily degradable, peroxidizable, hydrolyzable, hygroscopic, reactive, and highly toxic materials.

e. Spill and Accident Prevention - Every effort should be made to prevent chemical spills and accidents. In addition to the safety considerations, spills increase waste generation and disposal costs. One spill can more than double the amount of material to be disposed of as a hazardous waste for a given chemical.

f. Hazardous Materials Labeling - Properly labeling hazardous materials reduces the quantity of hazardous waste generated by eliminating the generation of unknowns. Materials that cannot be identified are not useful to laboratory personnel who lack the time or means to

identify them. These materials are disposed of and then replaced, increasing the overall quantity of hazardous waste generated.

NOTE: The generation of unknown materials suggests a need to improve laboratory and hazardous materials management. Investigate lab procedures to determine why unknowns are being generated and find solutions to any problems that surface.

500.30 Receiving Research Samples and Hazardous Materials from other Entities.

a. Hazardous materials received from industry, other universities, or any other second party for purposes of research, testing, etc., that will not be totally consumed in the process should only be accepted under the condition that the party from which they originated accepts back any unused material. These materials include, but are not limited to, pesticides, ores and contaminated soil samples, compressed gases, fuels, and experimental chemicals. Hazardous materials offered to the university must be scrutinized because they may be trying to convince university employees to accept certain chemicals or products that are very expensive and/or difficult to dispose of as chemical or hazardous waste. Contact EHS for guidance if approached by anyone offering hazardous materials for free or at a greatly reduced cost before agreeing to accept them.

Hazardous Materials Management & Disposal

Policy & Procedures Manual

PART 600 - SPECIAL HAZARD INFORMATION

Subpart A - Hazardous Materials Recognition

600.01 General

a. Hazard recognition is the first step in hazardous materials management. Because hazardous materials often exhibit more than one hazardous characteristic (e.g., some materials are capable of being flammable, poisonous and corrosive), users should become informed of all hazardous characteristics of a material by reviewing appropriate sources of information.

b. The university's Administrative Procedures Manual (APM) Section 35.61 – Safety Data Sheets (SDS) provides procedures to be followed by students, employees, and faculty to ensure that SDS are available for those working with hazardous materials. Please refer to this section for guidance in maintaining an SDS library for your area.

600.10 Safety Data Sheets (SDS)

a. SDSs provide information about hazardous materials to aid users when handling, storing, and cleaning up spills, and to ensure their proper disposal. Information provided in SDSs includes manufacturer information, hazardous constituents, physical and chemical characteristics, fire and explosion hazard data, reactivity data, health hazard data, precautions for safe handling and use, control measures, and more.

   Manufacturers are required by law to provide SDSs for each hazardous material they sell. Keep SDSs readily accessible and updated for all chemicals used in a given area. SDSs are readily available online or directly from the manufacturer. Also, SDSs may need to be supplemented with information from other reference books.

600.20 Published Reference Materials

a. <u>General</u>

   1. No single hazardous materials reference source provides all the information required for the complete assessment of hazardous materials, making it necessary to have more than one reference source on hand. There are many books available that provide handling,

storage, clean up, toxicity, and other information on hazardous materials. Below is a partial list of reference books available.

i. **Safety, The Sigma-Aldrich Library of Chemical Safety Data, Edition 2 (1988)** - Toxicity, health hazard, first aid, incompatibility, decomposition, handling, storage, spill response, and cleanup information and data given.

ii. **The Department of Transportation (DOT)** – 49 CFR Chapter I, Subchapter A, Part 172.101 Hazardous Materials Table.

iii. **NIOSH Pocket Guide to Chemical Hazards, by the U.S. Department of Health and Human Services, (2010)** - A concise listing of chemical, exposure, incompatibility, personal protection, respirator, and health hazard information. The latest edition is available online at http://www.cdc.gov/niosh/npg/.

iv. **Fire Protection Guide to Hazardous Materials, Twelfth Edition (2023)**, National Fire Protection Association – Organized in a format similar to Safety Data Sheets.

600.30 Safety Equipment and Personnel Protection

a. General

1. Handling hazardous materials requires the use of safety equipment and personal protective equipment. An individual using hazardous materials must understand the limitations and capabilities of the equipment to obtain effective protection from exposure to the chemical being used.

b. Safety Equipment - safety equipment should be used accordingly to minimize chemical exposure whenever appropriate, and may include:

1. **Chemical Fume Hoods** - Work involving volatile chemicals should be done in a properly functioning chemical fume hood.

2. **Explosion Shields** - Work involving chemicals, high pressures, and vacuums, etc., that poses an explosion/implosion risk should be conducted behind a safety shield for added protection.

3. **Secondary Containment** - Use trays, tubs, mats, and other devices as secondary containment for hazardous materials to minimize spill cleanup and contamination of work and other surfaces.

c. Personal Protective Equipment (PPE) - Equipment may include, but is not limited to:

1. **Eye Protection** - Many styles of protective eyeglasses and goggles with different levels of eye protection are available. Choose a style that is comfortable yet provides maximum

splash and impact protection. It may be necessary to have several types available for different applications.

2. **Gloves** - No single glove material provides 100% chemical protection from all chemicals. Choose a glove material that provides maximum protection for the specific material being handled. Manufacturers often provide specifications for a material's durability to a variety of hazardous materials. Other publications exist that provide similar information.

3. **Face shields** - When using a face shield, it is essential to wear eye protection underneath. Face shields should always be worn in conjunction with goggles to provide comprehensive protection for the entire face and neck against chemical exposure and impacts from small explosions.

4. **Lab coats** - Lab coats help protect street clothes and skin from chemical contamination. There are fabrics available that can provide a limited degree of fire protection (e.g., Nomex).

5. **Respirators** - Respirators can provide added protection from the inhalation of fumes, vapors, dusts, and mists. However, **respirators should never be used to replace a fume hood or other engineering controls**. Also, respirators can only provide protection from chemical exposure if the chemicals are identified, their maximum allowable airborne concentrations are not exceeded, a good seal with the face is achieved, and the correct cartridges are used. Personnel who desire to use a respirator must check with EHS and enroll in the respiratory protection program. The program includes annual medical surveillance, annual respirator fit testing, and annual training, provided by EHS, to ensure that the respirator is in good condition and being used correctly and safely.

d. Summary

1. Having knowledge of a material's hazardous properties and knowledge of the limitations and proper use of personal protective and other safety equipment will help ensure that hazardous materials are handled safely. Always consult the manufacturer's SDS for specific PPE requirements for the hazardous materials you will be using, and the manufacturer of the PPE to determine its effectiveness against those materials.

Subpart B - Reactive Materials

610.01 General

a. Reactive chemicals and materials can exhibit extremely hazardous physical and/or chemical characteristics and often require special handling, containment, packaging, and storage considerations. Become familiar with the characteristics of reactive materials and learn how to safely handle them before using them.

1. **Reactive Characteristics:** Water reactive, shock sensitive, air reactive (pyrophoric), highly toxic, spontaneously combustible, explosive (or chemical deflagration hazard), peroxide forming, organic peroxide, oxidizer, polymerizing, obnoxiously odiferous, and lachrymator are the most common reactive characteristics.

   NOTE: Reactive compounds may also exhibit subsidiary hazardous characteristics (e.g., corrosivity, toxicity, and flammability). Check the SDS or other reliable source of information to determine a material's subsidiary hazards.

610.05 Water Reactive Materials

a. Materials such as alkali metals, metal carbides, acid chlorides (both inorganic and organic), and isocyanates can react violently with water. Water reactive materials tend to be very corrosive and can produce highly flammable or toxic gases upon hydrolysis. These materials are extremely dangerous and should be submitted to EHS for disposal immediately if no longer needed. Sodium and other alkali metals may explode when exposed to appreciable volumes of water and must always be stored under mineral oil and protected from water. The following compounds or groups of compounds are examples of materials possessing or capable of possessing water reactive characteristics:

   1. **Alkali and alkaline earth metals** - e.g., potassium and sodium metals, magnesium and calcium metals.

   2. **Alkyl lithium and other metallic reagents** - e.g., butyl lithium, trimethylaluminum.

   3. **Boron trifluoride solutions**.

   4. **Grignard reagents** - e.g., butyl magnesium bromide.

   5. **Hydrides of Al, B, Ca, K, Li, Na**.

   6. **Anhydrous halides of Al, As, Fe, P, S, Sb, Si, Sn, Ti**.

   7. **Phosphorous oxychloride ($POCl_3$)** - Also known as phosphoryl chloride.

   8. **Phosphorous pentoxide (P_2O_5)**.

   9. **Thionyl chloride ($SOCl_2$) and sulfuryl chloride (**SO_2Cl_2**)**.

   10. **Fluorine gas**.

610.10 Shock Sensitive Materials

a. Shock-sensitive materials can react violently when subjected to friction, heat, or mechanical stress. *These chemicals are extremely dangerous*. Submit them for disposal immediately if no longer needed. Common shock sensitive chemicals usually fall into one of the following groups of compounds:

   1. **Diazo compounds**.

   2. **Metal azides**.

   3. **Nitrocelluloses**.

   4. **Perchlorate salts.***

   5. **Peroxidizable chemicals** - e.g., ethyl ether dioxane, etc.

   6. **Dry picric acid and picrate salts**.

   7. **Polynitroaromatic compounds** - e.g., trinitrotoluene (TNT), picric acid, etc.

   8. **Nitric esters of organic alcohols** - e.g., nitroglycerine, tetranitroerythritol.

   **Some perchlorate salts are more shock sensitive than others (e.g., lead perchlorate is much more shock sensitive than sodium perchlorate) and all are extremely dangerous when contaminated or combined with organic materials or reducing agents.*

610.15 Air Reactive (Pyrophoric) Materials

a. Phosphorus is the most recognized pyrophoric material. It must be noted that phosphorus exists in one of five allotropic forms: white, yellow, red, black, and violet phosphorus. Black and violet phosphorus are uncommon and rarely encountered. White and yellow phosphorus are the same allotropic form and will be referred to as white phosphorus. White phosphorus ignites spontaneously in air forming oxides of phosphorus which readily hydrolyze to phosphoric acid. White phosphorus must be stored under water at all times. Red phosphorus is less reactive than the white form and should be stored under mineral oil at all times. The fumes from burning phosphorus are extremely dangerous and can lead to serious lung injury if inhaled.

   Organometallic compounds (e.g., trimethylaluminum, tetramethyltin, dimethylcadmium, etc.) are capable of decomposing explosively in water, including moisture in the air

610.20 Highly Toxic Materials

a. Certain materials are so extremely toxic that their subsidiary hazards are considered a minimal risk in comparison. Methyl isocyanate, hydrocyanic acid, and chlorine gases are examples of highly toxic materials that pose extreme life-threatening situations upon exposure and also exhibit secondary hazardous characteristics, such as flammable (methylisocyanate & hydrocyanic acid), corrosive (hydrocyanic acid) and oxidizer (chlorines). Other materials that pose great risk due to their toxicity under certain conditions include inorganic cyanides and sulfides.

610.25 Spontaneously Combustible Materials

a. As previously stated, phosphorus and organometallic compounds will ignite spontaneously. Other materials can undergo spontaneous combustion but are not necessarily pyrophoric. Activated charcoal and even charcoal briquettes (especially after becoming damp) used for backyard barbecues are two examples of spontaneously combustible materials.

610.30 Explosion/Deflagration Hazard

a. Explosive materials, when triggered (or detonated), are capable of inflicting large-scale damage, destruction, injury, and loss of human life. A few examples of common laboratory chemicals that can explode under proper conditions are dry picric acid (especially picrate salts), dry trinitrotoluene (TNT), 2,4-dinitrophenol, nitroglycerine, and nitrocellulose.

610.35 Peroxide Forming Materials

a. Certain oxygen-containing organic compounds form peroxides upon exposure to air. Peroxide concentration upon distillation or evaporation of these materials presents an extremely dangerous situation. Minimal shock, friction, or heat can cause a violent reaction and fire when appreciable concentrations of peroxides accumulate in certain compounds (e.g., ethyl ether, isopropyl ether, tetrahydrofuran, dioxane, potassium metal and sodium amide). Adhering to the following guidelines should help keep ethers and other peroxidizable materials from achieving dangerous levels of peroxides.

1. **Peroxidizable Materials Management** - Peroxidizable compounds should be purchased according to short term needs to ensure that peroxide buildup from repeated exposure to oxygen is minimized. Peroxidizable materials stored in clear glass containers or in direct sunlight will also tend to form dangerous levels of peroxides over time. Ethers having peroxide concentrations of one percent (1%) or greater are very hazardous and should be disposed of immediately following proper disposal procedures.

i. Peroxide Hazards - Please heed the following warning:

***WARNING*:** Compounds suspected of having very high peroxide levels, because of visual observation, unusual viscosity, crystal formation, or age, should be considered **extremely dangerous**. The precautions taken for disposal of these materials should be the same as for any material that can detonate by friction or shock. **It is of the**

utmost importance that the container is not opened. The act of opening the container **could detonate peroxide crystals** under the container cap or other closure **resulting in an explosion**.

ii. Peroxide Testing Requirements - Peroxidizable materials should be tested for peroxide build up on a regular basis and before being submitted for disposal to EHS personnel. Peroxide concentrations can be determined quickly and accurately when tested with peroxide test strips. Peroxide test strips are available from most scientific vendors.

WARNING: These procedures apply only to recently purchased ethers. Old containers of ether that have been stored for long periods of time present an extreme explosion hazard and should never be opened or moved. Contact Environmental Health and Safety if an "old" ether container is discovered.

iii. Labeling - The labeling of peroxidizable materials should follow National Safety Council recommendations, which are:

a) **List I – Severe Peroxide Hazard** -

1) The date received
2) The date opened
3) The words: "Discard or Test Within 3 Months After Opening"

b) **Lists II/III – Concentration Hazard/Shock and Heat Sensitive** -

1) The date received
2) The date opened
3) The words: "Discard or Test Within 12 Months After Opening"

iv. Storage - All peroxidizable compounds should be stored away from heat and light. Sunlight is an especially good promoter of peroxidation. Protection from physical damage and ignition sources during storage is also essential. Particular care should be taken to ensure tight closure of storage containers. Loose or leaking closures permit evaporation during storage of the material, leaving behind a hazardous concentration of peroxides. Most common container materials, such as steel and stainless steel, baked phenolic linings, and ceramics are suitable for storing peroxidizable materials. However, they must be clean and free from metal oxides, which may promote peroxide formation.

v. Stabilization - The use of oxidation inhibitors is especially important in the safe handling of peroxidizable materials. Hydroquinone, alkyl phenolic aromatic amines, or similar materials are recommended by manufacturers for their effectiveness in preventing peroxide formation during storage. The selection of a proper inhibitor

should be made to avoid possible conflict with use or purity requirements of the compound. Label all materials with the stabilizer used and the date stabilized.

vi. Categories - Peroxide forming materials exhibit varying degrees of danger. Some commonly known peroxidizable compounds and their respective peroxidation hazard are listed here. For a more comprehensive list, refer to Appendix C.

a) **List I – Severe Peroxide Hazard** - These compounds form peroxides during storage that may become extremely hazardous (i.e., explosion hazard) without being concentrated. Test the following every 3 months:

Isopropyl ether, divinyl ether, potassium metal, vinylidene chloride, potassium and sodium amide (sodamide)

b) **List II – Concentration Hazard** - These compounds become extremely hazardous when peroxides become concentrated due to distillation or evaporation over time. Test the following every 6 months:

Dioxanes, ethylene glycol, dimethyl ether, ethyl ether, furan, tetrahydrofuran (THF), methyl acetylene, acetal, methyl cyclopentane, cumene, methyl-isobutyl ketone, cyclohexane, tetrahydronaphthalene, diacetylene, vinyl ethers, dicyclopentadiene

c) **List III – Shock and Heat Sensitive** - These compounds are a peroxide hazard due to their tendency to undergo peroxide-initiated polymerization. Test the following materials every 6 months:

Butadiene, vinyl acetate, chloroprene, vinyl acetylene, chlorotrifluoroethylene, vinyl chloride, styrene, vinyl pyridine, tetrafluoroethylene

NOTE: When stored as a liquid, the peroxide-forming potential increases for these compounds (especially butadiene, chloroprene, and tetrafluoroethylene) and, therefore, should also be considered a peroxide hazard during storage.

NOTE: The above lists are NOT all-inclusive; check the SDS (or other reference) for the peroxide-forming potential of the material you are using.

610.40 Oxidizing Materials

a. Oxidizers possess the ability to react violently with a large spectrum of materials. Because oxidizers are often a source of oxygen, they will greatly enhance and sustain fire. Materials (cloth, asphalt, tar, fuels, etc.) will burn with little incitement when saturated with liquid oxygen. Iron burns so vigorously in liquid oxygen that it melts from the heat of combustion.

Oxidizers are grouped into two categories, organic and inorganic oxidizers. They should always be segregated from each other and all other materials.

1. **Organic Oxidizers** - Organic nitrates/nitrites and peroxides make up the two largest groups of organic oxidizers. Organic oxidizers are inherently unstable and can undergo rapid decomposition, resulting in a violent explosion.

   i. Organic Nitrates/Nitrites - Organic nitrates/nitrites (e.g., butyl nitrate) are often very unstable, highly flammable, and tend to be shock sensitive. Extreme care should be taken during periods of handling and storage.

   ii. Organic Peroxides - Like organic nitrates, organic peroxides pose serious fire and explosion hazards due to their intrinsically unstable nature. Organic peroxides are best stored under water (>20%) and at cold temperatures. Organic peroxides, when heated to a certain point, are likely to spontaneously ignite and/or explode. The temperature at which an explosion is most likely to occur is called the self-accelerating decomposition temperature (SADT) and varies from one compound to another.

2. **Inorganic Oxidizers** - Inorganic oxidizers usually fall into one of three groups, nitrates/nitrites, peroxides, or highly oxygenated metal complex ions (e.g., dichromates, perchlorates and permanganates, etc.). Inorganic oxidizers tend to be more stable than organic oxidizers but are capable of very violent reactions, especially when contaminated with organics or other reducing materials. Only inorganic peroxides will be discussed here.

   i. Inorganic Peroxides - (e.g., Sodium peroxide and lead peroxide) Aside from being oxidizers, alkali and alkaline peroxides tend to be water reactive and should be protected from contacting water or absorbing moisture from the air.

610.45 Polymerizable Materials

a. Polymerization hazard refers to the risk associated with compounds that undergo uncontrolled polymerization, especially when it occurs rapidly and generates excessive heat, an explosion, or fire. Styrenes and acrylates are examples of compounds exhibiting the hazardous characteristic of polymerization. These materials must be stabilized with an inhibitor to prevent uncontrolled polymerization.

610.50 Obnoxiously Odiferous Materials

a. Compounds that emit pungent, strong, or otherwise foul odors can be indicative of a potential danger or health risk. Some compounds that have foul odors include mercaptans or thiols, and organic amines. Odiferous compounds are often very toxic; handle them with care.

610.55 Lachrymators

a. Lachrymators are chemicals that exhibit strong irritating effects to the eyes and mucus membrane tissues causing tearing, stinging and pain (e.g., chloroacetone, tear gas, and pepper spray). Lachrymators should be stored in a manner that minimizes leakage or can contain the release of the product from the container should it break or degrade. For example, double bag or place the chemical in another compatible container that can form an airtight seal with an absorbent material such as vermiculite to protect it from breaking.

Subpart C - Chemical Storage and Incompatibility

620.01 General

a. The correct storage of hazardous materials will minimize problems due to incompatibilities (e.g., fire, spill, and exposure to personnel). Store flammable liquids in an approved flammable liquids storage cabinet. Acids and bases should be stored in approved storage cabinets (always separate organics from inorganics). Never store chemicals alphabetically without regard to their hazardous characteristics and reactivity. The list below provides chemical storage guidelines for your reference:

620.10 Chemical Storage Guidelines

a. Follow in sequence for best results:

1. **Segregate** - First segregate organic from inorganic chemicals.

2. **Corrosives** - Store acids with acids and bases with bases.

3. **Oxidizers** - Oxidizers must be grouped together, away from all other chemicals.

4. **Flammable Liquids** - Flammable liquids shall be stored in a UL-certified flammable liquid storage cabinet.

5. **Pyrophoric Materials** - Pyrophoric materials must be stored in an inert atmosphere, in a desiccator, under water or other appropriate liquid specified for that material.

6. **Water Reactive Materials** - Water reactive materials must either be stored in a desiccator, or under a non-aqueous liquid specified for that material, or in an inert atmosphere (e.g., sodium metal is typically stored under mineral oil).

7. **Organic Amines** - Store organic amines together.

8. **Miscellaneous Organic Compounds** - Organic compounds not in any other reactive group can be stored together.

9. **Miscellaneous Inorganic Compounds** - Inorganic salts not in any other reactive group can be stored together.

NOTE: There are always exceptions to chemical compatibility. Please check each material's SDS or other reliable information for storage requirements.

Subpart D - Hazardous Materials Spill and Incident Response

630.01 General

a. Response to a hazardous material incident will depend on several factors, including: the amount of material spilled or involved in an incident, the physical and chemical characteristics of the material, the material's health hazards, the location of the spill, the level of response training obtained by the responders, and the types of personal protective and spill response equipment available. Each incident involving hazardous materials will be inherently unique given the set of circumstances surrounding the incident and will require specific considerations.

630.10 Quantity of Material

a. It is difficult to state precise criteria to determine when an individual should or should not attempt to clean their own hazardous material spill. Generally, the larger the spill, the more likely trained and equipped emergency response personnel will be needed to remediate the situation. Individuals with basic training and personal protective equipment could conceivably clean up several gallons of a material possessing low toxicity and minimal physical/chemical hazardous characteristics. However, it would be advisable for individuals to request professional assistance for spills involving a small quantity (one liter) of a material possessing high toxicity, reactivity, flammability, or other similarly hazardous characteristics.

630.20 Physical Characteristics

a. The physical state and characteristics of a material involved in an incident are very important. Gases are extremely difficult to control and can spread throughout a building very rapidly. Liquids and fine powders are less difficult than gases to control, and solids are the easiest to control. A material's physical characteristics should always be considered when working with and storing materials. Take time to note the location of sinks, floor drains and room exhaust vents, and store hazardous materials accordingly. Gases (and highly volatile liquids) should be stored in a well-ventilated room or cabinet, if possible.

630.30 Health Hazards

a. Hazardous materials possess varying types and degrees of toxicity and can inflict varying types and degrees of harm. Exposure to hazardous materials may cause one or more of the

following health hazards: cancer; genetic and/or reproductive effects; asphyxiation; death; permanent physiological damage to the skin, eyes, mucus membranes, and internal organs; and debilitating conditions and diseases. Exposure to hazardous materials can occur through inhalation, ingestion, subcutaneous injection, and absorption through the skin. Exposures may vary from acute to chronic exposure. **Acute** exposure occurs when an individual receives exposure to a relatively large quantity of a hazardous material within a short period of time. **Chronic** exposure involves exposure to a relatively small quantity of hazardous material over a long period of time. Poisons are materials which can cause permanent physiological damage to a variety of organs upon exposure. Corrosive and oxidizing materials are capable of inflicting irreparable damage to skin and other tissue upon contact. Irritants are a class of materials capable of causing great discomfort, rashes, and pain upon exposure to them. Fine dusts, powders, and fibrous materials may present an inhalation hazard that can cause respiratory discomfort, coughing, pain, and even fatal diseases over time. Engineering controls, such as fume hoods, and the proper selection and use of personal protective equipment, such as gloves and goggles, are paramount to protecting an individual from the harmful effects of exposure to a hazardous material.

630.40 Spill Location

a. The location of a spill dictates several important response actions:

1. **The Urgency of Response** - The urgency of response will be dictated by the circumstances of the incident. Has an acute exposure to personnel occurred or appear to be imminent? Is the material extremely reactive? Is the spill near a body of water?

2. **The Level of Personal Protective Equipment Required** - A small spill in a laboratory hood involving materials of low to moderate hazardous characteristics may only require minimal personal protective equipment (e.g., gloves, goggles, lab coat, etc.). However, a spill involving less than a liter of a highly toxic material of high volatility onto the floor would require a higher level of protection and require assistance from personnel that are professionally trained in hazardous materials incidents.

3. **Evacuation considerations** - Spills occurring within a hood would seldom require evacuation. Spills occurring in the hallway, on the stairway, etc., could very well require immediate evacuation.

4. **Containment and diversion controls** - Containment and diversion tactics are sometimes required to keep liquid chemical spills from reaching floor drains, electrical devices, heat sources, or to just keep it from spreading. If a spill is large enough to require diversion and containment tactics, assistance should immediately be sought from personnel that are professionally trained in hazardous materials incidents.

5. **Proximity to other hazards (e.g., electrical devices, heat sources, slip/fall hazards)** - A spill involving only water would not seem very hazardous unless it was in the vicinity of an energized electrical device. If the spill of an innocuous liquid material occurs in an active walkway, it should be cleaned up immediately to avoid a slip/fall hazard.

630.50 Training

a. Individuals handling hazardous materials in the laboratory or other work area usually have minimal training in spill response and only basic personal protective gear and response equipment available. EHS personnel have the training and personal protective equipment capability to respond to almost any type of hazardous material accident or incident that may occur on campus. Individuals should realize their limitations and not take unnecessary risks responding to hazardous materials incidents.

630.60 Personal Protective and Spill Response Equipment

a. Basic personal protective equipment usually found in most campus laboratories and workplaces includes gloves, safety eye wear, lab coats, and, occasionally, a respirator. However, spills often require more advanced equipment, including self-contained breathing apparatus (SCBA), chemical-resistant clothing, fully encapsulated suits, chemical absorbent materials, and containment equipment. This equipment is not routinely found in most laboratories or work areas.

   NOTE: The use of a respirator requires participation in the University of Idaho Respiratory Protection Program. Contact Environmental Health and Safety at 208-885-6524 for additional information.

630.70 Summary

a. Summary - The most important aspect of spill response is to protect your health or safety. Property can be replaced; your life or health cannot. Environmental Health and Safety personnel have received training and have the equipment necessary to properly respond to a hazardous materials incident.

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PART 700 - HAZARDOUS MATERIALS SHIPPING/TRANSPORTATION PROCEDURES

700.01 General

a. University employees and students who desire to ship or transport hazardous materials must inform EHS of their intent at least ten (10) business days, preferably more, prior to shipment. EHS personnel will help ensure that all state and federal regulations for the transportation of all materials have been met.

700.10 Procedure for Shipping/Transporting Hazardous Materials

a. Specific information is required to determine the necessary paperwork, packaging, labeling, and markings, etc., of hazardous materials or dangerous goods before they can be legally transported. The following information must be submitted in writing to EHS at least two weeks prior to the planned ship or transport date.

    1. **Index Number** – to pay for shipping costs and supplies.

    2. **Safety Data Sheet(s)** – An SDS for each product or substance being shipped.

    3. **Indicate if being shipped internationally** – Including Canada or Mexico.

    4. **Materials List** – A detailed list of all material(s) being shipped or transported.

    5. **Quantity** – The quantity of each material.

    6. **Location, etc.** – The name, address, and phone number of party or location hazardous materials are being shipped or transported to.

    7. **Type of Transportation** – The method of transportation (Federal Express, freight, or U of I vehicle are the only options).

    8. **Time frame** – How soon it needs to get there.

9. **Phone number/email address** – where you can be reached.

10. You **MUST** indicate if the material contains any of the following:

    a. Any amount of radioactive material.

    b. Asbestos.

    c. Biologically active/infectious or pathogenic material.

    d. Poison-Inhalation Hazard (PIH) material.

    e. Explosive – Any amount of an explosive material (including ammunition, fireworks, black powder, etc.).

    f. Compressed gas.

    g. Cryogenic material.

    h. Lithium batteries – An SDS is required, if possible.

    NOTE: if the material's hazardous characteristics are not known (e.g., newly synthesized compounds) provide hazard characteristics based on your knowledge and experience with the material. Chemical testing may be required to ship, unless it is to ship a sample to a lab for testing.

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PART 800 – SECURING AND ACCOUNTING FOR HAZARDOUS MATERIALS

800.01 General

b. Hazardous materials play an important role in teaching, research, maintenance, construction and cleaning activities at the university. To support these activities, the university has many locations that use and store a wide variety of hazardous materials, including many products possessing poison-inhalation hazard/highly toxic, compressed gas, infectious, water-reactive, explosive and radioactive properties. Therefore, management practices providing secure storage and usage of these products must be employed to keep employees and students safe and preventing their theft by terrorists and others.

800.10 Procedures for Securing and Accounting for Hazardous Materials

a. Do not leave laboratories, or other areas where hazardous materials are present, open, and unattended. It is best to keep entrance(s) to areas using/storing hazardous materials locked at all times.

b. When not in use, return hazardous materials to their proper storage area. Storage areas, such as chemical cabinets and closets, etc., should always be locked.

c. Maintain an inventory of hazardous materials, routinely check these materials and update the inventory frequently.

   i. Indicate products that appear in the EPA's acute hazardous waste table (40 CFR, §261.33 or Appendix A of this policy), or possess reactive, extreme toxicity or other properties that pose a serious risk to employees or the environment with an asterisk (i.e., *), bold type, italics or some other way so they stand out.

   ii. Providing a short list of extremely hazardous materials that indicates their hazards or using a code for different hazards indicated for materials and then providing a key for them is helpful.

d. Follow storage and handling protocols for other hazardous materials, such as radioactive materials, biological materials and controlled substances, that are not included in this policy.

e. Do not allow unauthorized personnel into your workspace. Calmly question the motives of people requesting access to your workspace, but do not allow them access until you verify that their reason is valid. Report anyone who seems suspicious to your supervisor.

f. If you notice any hazardous materials or equipment missing or believe they have been stolen, please contact the Moscow Police Department at 208-882-2677 and Environmental Health and Safety at 208-885-6524 if its absence cannot be accounted for.

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Appendix A: Acute Hazardous Wastes (P-Listed Wastes)

EPA ID No.	CAS No.	Substance
P023	107-20-0	Acetaldehyde, chloro-
P002	591-08-2	Acetamide, N-(aminothioxomethyl)-
P057	640-19-7	Acetamide, 2-fluoro-
P058	62-74-8	Acetic acid, fluoro-, sodium salt
P002	591-08-2	1-Acetyl-2-thiourea
P003	107-02-8	Acrolein
P070	116-06-3	Aldicarb
P203	1646-88-4	Aldicarb sulfone
P004	309-00-2	Aldrin
P005	107-18-6	Allyl alcohol
P006	20859-73-8	Aluminum phosphide (R,T)
P007	2763-96-4	5-(Aminomethyl)-3-isoxazolol
P008	504-24-5	4-Aminopyridine
P009	131-74-8	Ammonium picrate (R)
P119	7803-55-6	Ammonium vanadate
P099	506-61-6	Argentate(1-), bis(cyano-C)-, potassium
P010	7778-39-4	Arsenic acid H_3AsO_4
P012	1327-53-3	Arsenic oxide As_2O_3
P011	1303-28-2	Arsenic oxide As_2O_5

P011	1303-28-2	Arsenic pentoxide
P012	1327-53-3	Arsenic trioxide
P038	692-42-2	Arsine, diethyl-
P036	696-28-6	Arsonous dichloride, phenyl-
P054	151-56-4	Aziridine
P067	75-55-8	Aziridine, 2-methyl-
P013	542-62-1	Barium cyanide
P024	106-47-8	Benzenamine, 4-chloro-
P077	100-01-6	Benzenamine, 4-nitro-
P028	100-44-7	Benzene, (chloromethyl)-
P042	51-43-4	1,2-Benzenediol, 4-[1-hydroxy-2-(methylamino)ethyl]-, (R)-
P046	122-09-8	Benzeneethanamine, alpha,alpha-dimethyl-
P014	108-98-5	Benzenethiol
P127	1563-66-2	7-Benzofuranol, 2,3-dihydro-2,2-dimethyl-, methylcarbamate.
P188	57-64-7	Benzoic acid, 2-hydroxy-, compd. with (3aS-cis)- 1,2,3,3a,8,8a-hexahydro-1,3a,8-trimethylp yrrolo[2,3-b]indol-5-yl methylcarbamate ester (1:1)
P001	[1]81-81-2	2H-1-Benzopyran-2-one, 4-hydroxy-3-(3-oxo-1- phenylbutyl)-, & salts, when present at concentrations greater than 0.3%
P028	100-44-7	Benzyl chloride
P015	7440-41-7	Beryllium powder
P017	598-31-2	Bromoacetone

P018	357-57-3	Brucine
P045	39196-18-4	2-Butanone, 3,3-dimethyl-1-(methylthio)- O-[methylamino)carbonyl] oxime
P021	592-01-8	Calcium cyanide
P021	592-01-8	Calcium cyanide $Ca(CN)_2$
P189	55285-14-8	Carbamic acid, [(dibutylamino)- thio]methyl-, 2,3-dihydro-2,2-dimethyl-7-benzofuranyl ester
P191	644-64-4	Carbamic acid, dimethyl-, 1-[(dimethyl- amino)carbonyl]- 5-methyl-1H-pyrazol- 3-yl ester
P192	119-38-0	Carbamic acid, dimethyl-, 3-methyl-1- (1-methylethyl)-1H- pyrazol-5-yl ester
P190	1129-41-5	Carbamic acid, methyl-, 3-methylphenyl ester
P127	1563-66-2	Carbofuran
P022	75-15-0	Carbon disulfide
P095	75-44-5	Carbonic dichloride
P189	55285-14-8	Carbosulfan
P023	107-20-0	Chloroacetaldehyde
P024	106-47-8	p-Chloroaniline
P026	5344-82-1	1-(o-Chlorophenyl)thiourea
P027	542-76-7	3-Chloropropionitrile
P029	544-92-3	Copper cyanide
P029	544-92-3	Copper cyanide Cu(CN)
P202	64-00-6	m-Cumenyl methylcarbamate

P030	……	Cyanides (soluble cyanide salts), not otherwise specified
P031	460-19-5	Cyanogen
P033	506-77-4	Cyanogen chloride
P033	506-77-4	Cyanogen chloride (CN)Cl
P034	131-89-5	2-Cyclohexyl-4,6-dinitrophenol
P016	542-88-1	Dichloromethyl ether
P036	696-28-6	Dichlorophenylarsine
P037	60-57-1	Dieldrin
P038	692-42-2	Diethylarsine
P041	311-45-5	Diethyl-p-nitrophenyl phosphate
P040	297-97-2	O,O-Diethyl O-pyrazinyl phosphorothioate
P043	55-91-4	Diisopropylfluorophosphate (DFP)
P004	309-00-2	1,4,5,8-Dimethanonaphthalene, 1,2,3,4, 10,10-hexa- chloro-1,4,4a,5,8,8a,-hexahydro-, (1alpha,4alpha,4abeta, 5alpha,8alpha,8abeta)-
P060	465-73-6	1,4,5,8-Dimethanonaphthalene, 1,2,3,4,10,10-hexa- chloro-1,4,4a,5,8,8a-hexahydro-,(1alpha, 4alpha,4abeta,5beta,8beta,8abeta)-
P037	60-57-1	2,7:3,6-Dimethanonaphth[2,3-b]oxirene, 3,4,5,6,9,9- hexachloro-1a,2,2a,3,6,6a,7,7a-octahydro-,(1aalpha, 2beta,2aalpha,3beta,6beta,6aalpha,7beta, 7aalpha)-
P051	[1]72-20-8	2,7:3,6-Dimethanonaphth [2,3-b]oxirene, 3,4,5,6,9,9- hexachloro-1a,2,2a,3,6,6a,7,7a-octahydro-, (1aalpha,2beta, 2abeta,3alpha,6alpha,6abeta,7beta, 7aalpha)-, & metabolites
P044	60-51-5	Dimethoate
P046	122-09-8	alpha,alpha-Dimethylphenethylamine

P191	644-64-4	Dimetilan
P047	[1]534-52-1	4,6-Dinitro-o-cresol, & salts
P048	51-28-5	2,4-Dinitrophenol
P020	88-85-7	Dinoseb
P085	152-16-9	Diphosphoramide, octamethyl-
P111	107-49-3	Diphosphoric acid, tetraethyl ester
P039	298-04-4	Disulfoton
P049	541-53-7	Dithiobiuret
P185	26419-73-8	1,3-Dithiolane-2-carboxaldehyde, 2,4-dimethyl-, O-[(methylamino)-carbonyl]oxime
P050	115-29-7	Endosulfan
P088	145-73-3	Endothall
P051	72-20-8	Endrin
P051	72-20-8	Endrin, & metabolites
P042	51-43-4	Epinephrine
P031	460-19-5	Ethanedinitrile
P194	23135-22-0	Ethanimidothioc acid, 2-(dimethylamino)-N- [[(methylamino) carbonyl]oxy]-2 -oxo-, methyl ester.
P066	16752-77-5	Ethanimidothioic acid, N-[[(methylamino) carbonyl]oxy]-, methyl ester
P101	107-12-0	Ethyl cyanide
P054	151-56-4	Ethyleneimine
P097	52-85-7	Famphur

P056	7782-41-4	Fluorine
P057	640-19-7	Fluoroacetamide
P058	62-74-8	Fluoroacetic acid, sodium salt
P198	23422-53-9	Formetanate hydrochloride
P197	17702-57-7	Formparanate
P065	628-86-4	Fulminic acid, mercury(2+) salt (R,T)
P059	76-44-8	Heptachlor
P062	757-58-4	Hexaethyl tetraphosphate
P116	79-19-6	Hydrazinecarbothioamide
P068	60-34-4	Hydrazine, methyl-
P063	74-90-8	Hydrocyanic acid
P063	74-90-8	Hydrogen cyanide
P096	7803-51-2	Hydrogen phosphide
P060	465-73-6	Isodrin
P192	119-38-0	Isolan
P202	64-00-6	3-Isopropylphenyl N-methylcarbamate.
P007	2763-96-4	3(2H)-Isox azolone, 5-(aminomethyl)-
P196	15339-36-3	Manganese, bis(dimethylcarbamodithioato-S,S')-,
P196	15339-36-3	Manganese dimethyldithiocarbamate.
P092	62-38-4	Mercury, (acetato-O)phenyl-
P065	628-86-4	Mercury fulminate (R,T)

P198	23422-53-9	Methanimidamide, N,N-dimethyl-N'-[3- [[(methylamino)-carbonyl]oxy]phenyl]-, monohydrochloride.
P197	17702-57-7	Methanimidamide, N,N-dimethyl-N'-[2-methyl-4-[[(methylamino)carbonyl]oxy]p henyl]-
P082	62-75-9	Methanamine, N-methyl-N-nitroso-
P064	624-83-9	Methane, isocyanato-
P016	542-88-1	Methane, oxybis[chloro-
P112	509-14-8	Methane, tetranitro- (R)
P118	75-70-7	Methanethiol, trichloro-
P050	115-29-7	6,9-Methano-2,4,3-benzodioxathiepin, 6,7,8,9,10,10- hexichloro-1,5,5a,6,9,9a-hexahydro-, 3-oxide
P059	76-44-8	4,7-Methano-1H-indene, 1,4,5,6,7,8,8-heptachloro-3a,4,7,7a-tetrahydro-
P199	2032-65-7	Methiocarb
P066	16752-77-5	Methomyl
P068	60-34-4	Methyl hydrazine
P064	624-83-9	Methyl isocyanate
P069	75-86-5	2-Methyllactonitrile
P071	298-00-0	Methyl parathion
P190	1129-41-5	Metolcarb
P128	315-18-4	Mexacarbate
P072	86-88-4	alpha-Naphthylth iourea

P073	13463-39-3	Nickel carbonyl
P073	13463-39-3	Nickel carbonyl $Ni(CO)_4$, (T-4)-
P074	557-19-7	Nickel cyanide
P074	557-19-7	Nickel cyanide $Ni(CN)_2$
P075	[1]54-11-5	Nicotine, & salts
P076	10102-43-9	Nitric oxide
P077	100-01-6	p-Nitroaniline
P078	10102-44-0	Nitrogen dioxide
P076	10102-43-9	Nitrogen oxide NO
P078	10102-44-0	Nitrogen oxide NO_2
P081	55-63-0	Nitroglycerine (R)
P082	62-75-9	N-Nitrosodimethylamine
P084	4549-40-0	N-Nitrosomethylvinylamine
P085	152-16-9	Octamethylpyrophosphoramide
P087	20816-12-0	Osmium oxide OsO_4, (T-4)-
P087	20816-12-0	Osmium tetroxide
P088	145-73-3	7-Oxabicyclo[2.2.1]heptane-2,3-dicarboxylic acid
P194	23135-22-0	Oxamyl
P089	56-38-2	Parathion
P034	131-89-5	Phenol, 2-cyclohexyl-4,6-dinitro-
P048	51-28-5	Phenol, 2,4-dinitro-

P047	[1]534-52-1	Phenol, 2-methyl-4,6-dinitro-, & salts
P020	88-85-7	Phenol, 2-(1-methylpropyl)-4,6-dinitro-
P009	131-74-8	Phenol, 2,4,6-trinitro-, ammonium salt (R)
P128	315-18-4	Phenol, 4-(dimethylamino)-3,5-dimethyl-, methylcarbamate (ester)
P199	2032-65-7	Phenol, (3,5-dimethyl-4-(methylthio)-, methylcarbamate
P202	64-00-6	Phenol, 3-(1-methylethyl)-, methyl carbamate
P201	2631-37-0	Phenol, 3-methyl-5-(1-methylethyl)-, methyl carbamate
P092	62-38-4	Phenylmercury acetate
P093	103-85-5	Phenylthiourea
P094	298-02-2	Phorate
P095	75-44-5	Phosgene
P096	7803-51-2	Phosphine
P041	311-45-5	Phosphoric acid, diethyl 4-nitrophenyl ester
P039	298-04-4	Phosphorodithioic acid, O,O-diethyl S-[2-(ethylthio)ethyl] ester
P094	298-02-2	Phosphorodithioic acid, O,O-diethyl S-[(ethylthio)methyl] ester
P044	60-51-5	Phosphorodithioic acid, O,O-dimethyl S-[2-(methylamino)- 2-oxoethyl] ester
P043	55-91-4	Phosphorofluoridic acid, bis(1-methylethyl) ester
P089	56-38-2	Phosphorothioic aci O,O-dimethyl ester
P040	297-97-2	Phosphorothioic acid, O,O-diethyl O-pyrazinyl ester

P097	52-85-7	Phosporothioic acid, O-[4-[(dimethylamino) sulfonyl]phenyl]0,0-dimethyl ester
P071	298-00-0	Phosphorothioic acid, O,O,-dimethyl O-(4-nitrophenyl) ester
P204	57-47-6	Physostigmine
P188	57-64-7	Physostigmine salicylate
P110	78-00-2	Plumbane, tetraethyl-
P098	151-50-8	Potassium cyanide
P098	151-50-8	Potassium cyanide K(CN)
P099	506-61-6	Potassium silver cyanide
P201	2631-37-0	Promecarb
P070	116-06-3	Propanal, 2-methyl-2-(methylthio)-, O-[(methylamino)carbonyl]oxime
P203	1646-88-4	Propanal, 2-methyl-2-(methyl-sulfonyl)-, O-[(methylamino)carbonyl] oxime.
P101	107-12-0	Propanenitrile
P027	542-76-7	Propanenitrile, 3-chloro-
P069	75-86-5	Propanenitrile, 2-hydroxy-2-methyl-
P081	55-63-0	1,2,3-Propanetriol, trinitrate (R)
P017	598-31-2	2-Propanone, 1-bromo-
P102	107-19-7	Propargyl alcohol
P003	107-02-8	2-Propenal
P005	107-18-6	2-Propen-1-ol

P067	75-55-8	1,2-Propylenimine
P102	107-19-7	2-Propyn-1-ol
P008	504-24-5	4-Pyridinamine
P075	[1]54-11-5	Pyridine, 3-(1-methyl-2-pyrrolidinyl)-, (S)-, & salts
P204	57-47-6	Pyrrolo[2,3-b]indol-5-ol, 1,2,3,3a,8,8a-hexahydro-1,3a,8-trimethyl-, methylcarbamate (ester), (3aS-cis)-
P114	12039-52-0	Selenious acid, dithallium(1+) salt
P103	630-10-4	Selenourea
P104	506-64-9	Silver cyanide
P104	506-64-9	Silver cyanide Ag(CN)
P105	26628-22-8	Sodium azide
P106	143-33-9	Sodium cyanide
P106	143-33-9	Sodium cyanide Na(CN)
P108	[1]57-24-9	Strychnidin-10-one, & salts
P018	357-57-3	Strychnidin-10-one, 2,3-dimethoxy-
P108	[1]57-24-9	Strychnine, & salts
P115	7446-18-6	Sulfuric acid, dithallium(1+) salt
P109	3689-24-5	Tetraethyldithiopyrophosphate
P110	78-00-2	Tetraethyl lead
P111	107-49-3	Tetraethyl pyrophosphate
P112	509-14-8	Tetranitromethane (R)
P062	757-58-4	Tetraphosphoric acid, hexaethyl ester

P113	1314-32-5	Thallic oxide
P113	1314-32-5	Thallium oxide Tl2O3
P114	12039-52-0	Thallium(I) selenite
P115	7446-18-6	Thallium(I) sulfate
P109	3689-24-5	Thiodiphosphoric acid, tetraethyl ester
P045	39196-18-4	Thiofanox
P049	541-53-7	Thioimidodi carbonic diamide [(H2N)C(S)]2NH
P014	108-98-5	Thiophenol
P116	79-19-6	Thiosemicarbazide
P026	5344-82-1	Thiourea, (2-chlorophenyl)-
P072	86-88-4	Thiourea, 1-naphthalenyl-
P093	103-85-5	Thiourea, phenyl-
P185	26419-73-8	Tirpate
P123	8001-35-2	Toxaphene
P118	75-70-7	Trichlorome thanethiol
P119	7803-55-6	Vanadic acid, ammonium salt
P120	1314-62-1	Vanadium oxide V_2O_5
P120	1314-62-1	Vanadium pentoxide
P084	4549-40-0	Vinylamine, N-methyl-N-nitroso-
P001	81-81-2	Warfarin, & salts, when present at concentrations greater than 0.3%
P205	137-30-4	Zinc, bis(dimethylcarbamodithioato-S,S)-

P121	557-21-1	Zinc cyanide
P121	557-21-1	Zinc cyanide $Zn(CN)_2$
P122	1314-84-7	Zinc phosphide Zn_3P_2, when present at concentrations greater than 10% (R,T)
P205	137-30-4	Ziram

[1]CAS Number given for parent compound only.

NOTE: The primary hazardous properties of these materials have been indicated by the letters T (Toxicity), and R (Reactivity). The absence of a letter indicates that the compound only is listed for acute toxicity.

NOTE: F027 hazardous wastes from non-specific sources include certain chlorophenols and are listed under the U-list but are acute hazardous wastes subject to the same exclusion limits as P-listed wastes. See footnote 2 for U-Listed Wastes in Appendix B.

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Appendix B: Toxic Wastes (U-Listed Wastes)

EPA ID No.	CAS No.	Substance
U394	30558-43-1	A2213
U001	75-07-0	Acetaldehyde (I)
U034	75-87-6	Acetaldehyde, trichloro-
U187	62-44-2	Acetamide, N-(4-ethoxyphenyl)-
U005	53-96-3	Acetamide, N-9H-fluoren-2-yl-
U240	[1]94-75-7	Acetic acid, (2,4-dichlorophenoxy)-, salts & esters
U112	141-78-6	Acetic acid ethyl ester (I)
U144	301-04-2	Acetic acid, lead(2+) salt
U214	563-68-8	Acetic acid, thallium(1+) salt
see F027[2]	93-76-5	Acetic acid, (2,4,5-trichlorophenoxy)-
U002	67-64-1	Acetone (I)
U003	75-05-8	Acetonitrile (I,T)
U004	98-86-2	Acetophenone
U005	53-96-3	2-Acetylaminofluorene
U006	75-36-5	Acetyl chloride (C,R,T)
U007	79-06-1	Acrylamide
U008	79-10-7	Acrylic acid (I)
U009	107-13-1	Acrylonitrile
U011	61-82-5	Amitrole

U012	62-53-3	Aniline (I,T)
U136	75-60-5	Arsinic acid, dimethyl-
U014	492-80-8	Auramine
U015	115-02-6	Azaserine
U010	50-07-7	Azirino[2,3: 3,4]pyrrolo [1,2-a]indole-4,7-dione, 6-amino-8-[[(aminocarbonyl) oxy]methyl]-1,1a,2,8,8a,8b- hexahydro-8a-methoxy-5-methyl-, (1aalpha, 8beta, 8aalpha,8balpha)]
U280	101-27-9	Barban
U278	22781-23-3	Bendiocarb
U364	22961-82-6	Bendiocarb phenol
U271	17804-35-2	Benomyl
U157	56-49-5	Benz[j]aceanthrylene, 1,2-dihydro-3-methyl-
U016	225-51-4	Benz[c]acridine
U017	98-87-3	Benzal chloride
U192	23950-58-5	Benzamide, 3,5-dichloro-N-(1,1-dimethyl-2-propynyl)-
U018	56-55-3	Benz[a]anthracene
U094	57-97-6	Benz[a]anthracene, 7,12-dimethyl-
U012	62-53-3	Benzenamine (I,T)
U014	492-80-8	Benzenamine, 4,4 -carbonimidoylbis[N,N-dimethyl-
U049	3165-93-3	Benzenamine, 4-chloro-2-methyl-, hydrochloride
U093	60-11-7	Benzenamine, N,N-dimethyl-4-(phenylazo)-
U328	95-53-4	Benzenamine, 2-methyl-

U353	106-49-0	Benzenamine, 4-methyl-
U158	101-14-4	Benzenamine, 4,4 -methylenebis[2-chloro-
U222	636-21-5	Benzenamine, 2-methyl-, hydrochloride
U181	99-55-8	Benzenamine, 2-methyl-5-nitro-
U019	71-43-2	Benzene (I,T)
U038	510-15-6	Benzeneacetic acid, 4-chloro-alpha-(4-chlorophenyl)-alpha-hydroxy-, ethyl ester
U030	101-55-3	Benzene, 1-bromo-4-phenoxy-
U035	305-03-3	Benzenebutanoic acid, 4-[bis(2-chloroethyl)amino]-
U037	108-90-7	Benzene, chloro-
U221	25376-45-8	Benzenediamine, ar-methyl-
U028	117-81-7	1,2-Benzenedicarboxylic acid, bis(2-ethylhexyl) ester
U069	84-74-2	1,2-Benzenedicarboxylic acid, dibutyl ester
U088	84-66-2	1,2-Benzenedicarboxylic acid, diethyl ester
U102	131-11-3	1,2-Benzenedicarboxylic acid, dimethyl ester
U107	117-84-0	1,2-Benzenedicarboxylic acid, dioctyl ester
U070	95-50-1	Benzene, 1,2-dichloro-
U071	541-73-1	Benzene, 1,3-dichloro-
U072	106-46-7	Benzene, 1,4-dichloro-
U060	72-54-8	Benzene, 1,1 -(2,2-dichloroethylidene)bis[4-chloro-
U017	98-87-3	Benzene, (dichloromethyl)-
U223	26471-62-5	Benzene, 1,3-diisocyanatomethyl- (R,T)

U239	1330-20-7	Benzene, dimethyl- (I,T)
U201	108-46-3	1,3-Benzenediol
U127	118-74-1	Benzene , hexachloro-
U056	110-82-7	Benzene, hexahydro- (I)
U220	108-88-3	Benzene, methyl-
U105	121-14-2	Benzene, 1-methyl-2,4-dinitro-
U106	606-20-2	Benzene, 2-methyl-1,3-dinitro-
U055	98-82-8	Benzene, (1-methylethyl)- (I)
U169	98-95-3	Benzene, nitro-
U183	608-93-5	Benzene, pentachloro-
U185	82-68-8	Benzene, pentachloronitro-
U020	98-09-9	Benzenesulfonic acid chloride (C,R)
U020	98-09-9	Benzenesulfonyl chloride (C,R)
U207	95-94-3	Benzene, 1,2,4,5-tetrachloro-
U061	50-29-3	Benzene, 1,1 -(2,2,2-trichloroethylidene)bis[4-chloro-
U247	72-43-5	Benzene, 1,1 -(2,2,2-trichloroethylidene)bis[4- methoxy-
U023	98-07-7	Benzene, (trichloromethyl)-
U234	99-35-4	Benzene, 1,3,5-trinitro-
U021	92-87-5	Benzidine
U202	[1]81-07-2	1,2-Benzisothiazol-3(2H)-one, 1,1-dioxide, & salts
U278	22781-23-3	1,3-Benzodioxol-4-ol, 2,2-dimethyl-, methyl carbamate

U364	22961-82-6	1,3-Benzodioxol-4-ol, 2,2-dimethyl-,
U203	94-59-7	1,3-Benzodioxole, 5-(2-propenyl)-
U141	120-58-1	1,3-Benzodioxole, 5-(1-propenyl)-
U367	1563-38-8	7-Benzofuranol, 2,3-dihydro-2,2-dimethyl-
U090	94-58-6	1,3-Benzodioxole, 5-propyl-
U064	189-55-9	Benzo[rst]pentaphene
U248	[1]81-81-2	2H-1-Benzopyran-2-one, 4-hydroxy-3-(3-oxo-1-phenyl-butyl)-, & salts, when present at concentrations of 0.3% or less
U022	50-32-8	Benzo[a]pyrene
U197	106-51-4	p-Benzoquinone
U023	98-07-7	Benzotrichloride (C,R,T)
U085	1464-53-5	2,2 -Bioxirane
U021	92-87-5	[1,1'–Biphenyl]-4,4'-diamine
U073	91-94-1	[1,1'-Biphenyl]-4,4'-diamine, 3,3'-dichloro-
U091	119-90-4	[1,1'-Biphenyl]-4,4'-diamine, 3,3'-dimethoxy-
U095	119-93-7	[1,1'-Biphenyl]-4,4'-diamine, 3,3'-dimethyl-
U225	75-25-2	Bromoform
U030	101-55-3	4-Bromophenyl phenyl ether
U128	87-68-3	1,3-Butadiene, 1,1,2,3,4,4-hexachloro-
U172	924-16-3	1-Butanamine, N-butyl-N-nitroso-
U031	71-36-3	1-Butanol (I)
U159	78-93-3	2-Butanone (I,T)

U160	1338-23-4	2-Butanone, peroxide (R,T)
U053	4170-30-3	2-Butenal
U074	764-41-0	2-Butene, 1,4-dichloro- (I,T)
U143	303-34-4	2-Butenoic acid, 2-methyl-, 7-[[2,3-dihydroxy- 2-(1-methoxyethyl)-3-methyl-1-oxobutoxy _methyl_-2,3,5,7a-tetrahydro-1H-pyrrolizin-1-yl ester, [1S-[1alpha(Z), 7(2S*,3R*),7aalpha]]-
U031	71-36-3	n-Butyl alcohol (I)
U136	75-60-5	Cacodylic acid
U032	13765-19-0	Calcium chromate
U372	10605-21-7	Carbamic acid, 1H-benzimidazol-2-yl, methyl ester
U271	17804-35-2	Carbamic acid, [1-[(butylamino)carbonyl -1H-benzimidazol-2-yl -, methyl ester
U280	101-27-9	Carbamic acid, (3-chlorophenyl)-, 4-chloro- 2-butynyl ester
U238	51-79-6	Carbamic acid, ethyl ester
U178	615-53-2	Carbamic acid, methylnitroso-, ethyl ester
U373	122-42-9	Carbamic acid, phenyl-, 1-methylethyl ester
U409	23564-05-8	Carbamic acid, [1,2-phenylenebis (iminocarbonothioyl) bis-, dimethyl ester
U097	79-44-7	Carbamic chloride, dimethyl-
U114	111-54-6	Carbamodithioic acid, 1,2-ethanediylbis-,salts & esters
U062	2303-16-4	Carbamothioic acid, bis(1-methylethyl)-, S-(2,3-dichloro-2-propenyl) ester
U389	2303-17-5	Carbamothioic acid, bis(1-methylethyl)-, S- (2,3,3-trichloro-2-propenyl) ester

U387	52888-80-9	Carbamothioic acid, dipropyl-, S- (phenylmethyl) ester
U279	63-25-2	Carbaryl
U372	10605-21-7	Carbendazim
U367	1563-38-8	Carbofuran phenol
U215	6533-73-9	Carbonic acid, dithallium(1+) salt
U033	353-50-4	Carbonic difluoride
U156	79-22-1	Carbonochloridic acid, methyl ester (I,T)
U033	353-50-4	Carbon oxyfluoride (R,T)
U211	56-23-5	Carbon tetrachloride
U034	75-87-6	Chloral
U035	305-03-3	Chlorambucil
U036	57-74-9	Chlordane, alpha & gamma isomers
U026	494-03-1	Chlornaphazin
U037	108-90-7	Chlorobenzene
U038	510-15-6	Chlorobenzilate
U039	59-50-7	p-Chloro-m-cresol
U042	110-75-8	2-Chloroethyl vinyl ether
U044	67-66-3	Chloroform
U046	107-30-2	Chloromethyl methyl ether
U047	91-58-7	beta-Chloronaphthalene
U048	95-57-8	o-Chlorophenol

U049	3165-93-3	4-Chloro-o-toluidine, hydrochloride
U032	13765-19-0	Chromic acid H2CrO4, calcium salt
U050	218-01-9	Chrysene
U051	- - - - - - - -	Creosote
U052	1319-77-3	Cresol (Cresylic acid)
U053	4170-30-3	Crotonaldehyde
U055	98-82-8	Cumene (I)
U246	506-68-3	Cyanogen bromide (CN)Br
U197	106-51-4	2,5-Cyclohexadiene-1,4-dione
U056	110-82-7	Cyclohexane (I)
U129	58-89-9	Cyclohexane, 1,2,3,4,5,6-hexachloro-, (1alpha,2alpha,3beta,4alpha,5alph a,6beta)-
U057	108-94-1	Cyclohexanone (I)
U130	77-47-4	1,3-Cyclopentadiene, 1,2,3,4,5,5-hexachloro-
U058	50-18-0	Cyclophosphamide
U240	[1]94-75-7	2,4-D, salts & esters
U059	20830-81-3	Daunomycin
U060	72-54-8	DDD
U061	50-29-3	DDT
U062	2303-16-4	Diallate
U063	53-70-3	Dibenz[a,h_anthracene
U064	189-55-9	Dibenzo[a,i_pyrene

U066	96-12-8	1,2-Dibromo-3-chloropropane
U069	84-74-2	Dibutyl phthalate
U070	95-50-1	o-Dichlorobenzene
U071	541-73-1	m-Dichlorobenzene
U072	106-46-7	p-Dichlorobenzene
U073	91-94-1	3,3'-Dichlorobenzidine
U074	764-41-0	1,4-Dichloro-2-butene (I,T)
U075	75-71-8	Dichlorodifluoromethane
U078	75-35-4	1,1-Dichloroethylene
U079	156-60-5	1,2-Dichloroethylene
U025	111-44-4	Dichloroethyl ether
U027	108-60-1	Dichloroisopropyl ether
U024	111-91-1	Dichloromethoxy ethane
U081	120-83-2	2,4-Dichlorophenol
U082	87-65-0	2,6-Dichlorophenol
U084	542-75-6	1,3-Dichloropropene
U085	1464-53-5	1,2:3,4-Diepoxybutane (I,T)
U395	5952-26-1	Diethylene glycol, dicarbamate
U108	123-91-1	1,4-Diethyleneoxide
U028	117-81-7	Diethylhexyl phthalate
U086	1615-80-1	N,N'-Diethylhydrazine

U087	3288-58-2	O,O-Diethyl S-methyl dithiophosphate
U088	84-66-2	Diethyl phthalate
U089	56-53-1	Diethylstilbesterol
U090	94-58-6	Dihydrosafrole
U091	119-90-4	3,3'-Dimethoxybenzidine
U092	124-40-3	Dimethylamine (I)
U093	60-11-7	p-Dimethylaminoazobenzene
U094	57-97-6	7,12-Dimethylbenz[a_anthracene
U095	119-93-7	3,3'-Dimethylbenzidine
U096	80-15-9	alpha,alpha-Dimethylbenzylhydroperoxide (R)
U097	79-44-7	Dimethylcarbamoyl chloride
U098	57-14-7	1,1-Dimethylhydrazine
U099	540-73-8	1,2-Dimethylhydrazine
U101	105-67-9	2,4-Dimethylphenol
U102	131-11-3	Dimethyl phthalate
U103	77-78-1	Dimethyl sulfate
U105	121-14-2	2,4-Dinitrotoluene
U106	606-20-2	2,6-Dinitrotoluene
U107	117-84-0	Di-n-octyl phthalate
U108	123-91-1	1,4-Dioxane
U109	122-66-7	1,2-Diphenylhydrazine

U110	142-84-7	Dipropylamine (1)
U111	621-64-7	Di-n-propylnitrosamine
U041	106-89-8	Epichlorohydrin
U001	75-07-0	Ethanal (1)
U404	121-44-8	Ethanamine, N,N-diethyl-
U174	55-18-5	Ethanamine, N-ethyl-N-nitroso-
U155	91-80-5	1,2-Ethanediamine, N,N-dimethyl-N'-2-pyridinyl-N'- (2-thienylmethyl)-
U067	106-93-4	Ethane, 1,2-dibromo-
U076	75-34-3	Ethane, 1,1-dichloro-
U077	107-06-2	Ethane, 1,2-dichloro-
U131	67-72-1	Ethane, hexachloro-
U024	111-91-1	Ethane, 1,1'-[methylenebis(oxy)_bis[2-chloro-
U117	60-29-7	Ethane, 1,1'-oxybis-(I)
U025	111-44-4	Ethane, 1,1'-oxybis[2-chloro-
U184	76-01-7	Ethane, pentachloro-
U208	630-20-6	Ethane, 1,1,1,2-tetrachloro-
U209	79-34-5	Ethane, 1,1,2,2-tetrachloro-
U218	62-55-5	Ethanethioamide
U226	71-55-6	Ethane, 1,1,1-trichloro-
U227	79-00-5	Ethane, 1,1,2-trichloro-
U410	59669-26-0	Ethanimidothioic acid, N,N'- [thiobis [(methylimino)carbonyloxy__bis-, dimethyl ester

U394	30558-43-1	Ethanimidothioic acid, 2-(dimethylamino)-N- hydroxy-2-oxo-, methyl ester.
U359	110-80-5	Ethanol, 2-ethoxy-
U173	1116-54-7	Ethanol, 2,2'-(nitrosoimino)bis-
U395	5952-26-1	Ethanol, 2,2 -oxybis-, dicarbamate.
U004	98-86-2	Ethanone, 1-phenyl-
U043	75-01-4	Ethene, chloro-
U042	110-75-8	Ethene, (2-chloroethoxy)-
U078	75-35-4	Ethene, 1,1-dichloro-
U079	156-60-5	Ethene, 1,2-dichloro-, (E)-
U210	127-18-4	Ethene, tetrachloro-
U228	79-01-6	Ethene, trichloro-
U112	141-78-6	Ethyl acetate (I)
U113	140-88-5	Ethyl acrylate (I)
U238	51-79-6	Ethyl carbamate (urethane)
U117	60-29-7	Ethyl ether (I)
U114	[1]111-54-6	Ethylenebisdithiocarbamic acid, salts & esters
U067	106-93-4	Ethylene dibromide
U077	107-06-2	Ethylene dichloride
U359	110-80-5	Ethylene glycol monoethyl ether
U115	75-21-8	Ethylene oxide (I,T)
U116	96-45-7	Ethylenethiourea

U076	75-34-3	Ethylidene dichloride
U118	97-63-2	Ethyl methacrylate
U119	62-50-0	Ethyl methanesulfonate
U120	206-44-0	Fluoranthene
U122	50-00-0	Formaldehyde
U123	64-18-6	Formic acid (C,T)
U124	110-00-9	Furan (I)
U125	98-01-1	2-Furancarboxaldehyde (I)
U147	108-31-6	2,5-Furandione
U213	109-99-9	Furan, tetrahydro-(I)
U125	98-01-1	Furfural (I)
U124	110-00-9	Furfuran (I)
U206	18883-66-4	Glucopyranose, 2-deoxy-2-(3-methyl-3-nitrosoureido)-, D-
U206	18883-66-4	D-Glucose, 2-deoxy-2-[[(methylnitrosoamino)- carbonyl]amino]-
U126	765-34-4	Glycidylaldehyde
U163	70-25-7	Guanidine, N-methyl-N'-nitro-N-nitroso-
U127	118-74-1	Hexachlorobenzene
U128	87-68-3	Hexachlorobutadiene
U130	77-47-4	Hexachlorocyclopentadiene
U131	67-72-1	Hexachloroethane
U132	70-30-4	Hexachlorophene

U243	1888-71-7	Hexachloropropene
U133	302-01-2	Hydrazine (R,T)
U086	1615-80-1	Hydrazine, 1,2-diethyl-
U098	57-14-7	Hydrazine, 1,1-dimethyl-
U099	540-73-8	Hydrazine, 1,2-dimethyl-
U109	122-66-7	Hydrazine, 1,2-diphenyl-
U134	7664-39-3	Hydrofluoric acid (C,T)
U134	7664-39-3	Hydrogen fluoride (C,T)
U135	7783-06-4	Hydrogen sulfide
U135	7783-06-4	Hydrogen sulfide H_2S
U096	80-15-9	Hydroperoxide, 1-methyl-1-phenylethyl- (R)
U116	96-45-7	2-Imidazolidinethione
U137	193-39-5	Indeno[1,2,3-cd]pyrene
U190	85-44-9	1,3-Isobenzofurandione
U140	78-83-1	Isobutyl alcohol (I,T)
U141	120-58-1	Isosafrole
U142	143-50-0	Kepone
U143	303-34-4	Lasiocarpine
U144	301-04-2	Lead acetate
U146	1335-32-6	Lead, bis(acetato-O)tetrahydroxytri-
U145	7446-27-7	Lead phosphate

U146	1335-32-6	Lead subacetate
U129	58-89-9	Lindane
U163	70-25-7	MNNG
U147	108-31-6	Maleic anhydride
U148	123-33-1	Maleic hydrazide
U149	109-77-3	Malononitrile
U150	148-82-3	Melphalan
U151	7439-97-6	Mercury
U152	126-98-7	Methacrylonitrile (I, T)
U092	124-40-3	Methanamine, N-methyl- (I)
U029	74-83-9	Methane, bromo-
U045	74-87-3	Methane, chloro- (I, T)
U046	107-30-2	Methane, chloromethoxy-
U068	74-95-3	Methane, dibromo-
U080	75-09-2	Methane, dichloro-
U075	75-71-8	Methane, dichlorodifluoro-
U138	74-88-4	Methane, iodo-
U119	62-50-0	Methanesulfonic acid, ethyl ester
U211	56-23-5	Methane, tetrachloro-
U153	74-93-1	Methanethiol (I, T)
U225	75-25-2	Methane, tribromo-

U044	67-66-3	Methane, trichloro-
U121	75-69-4	Methane, trichlorofluoro-
U036	57-74-9	4,7-Methano-1H-indene, 1,2,4,5,6,7,8,8-octachloro- 2,3,3a,4,7,7a-hexahydro-
U154	67-56-1	Methanol (I)
U155	91-80-5	Methapyrilene
U142	143-50-0	1,3,4-Metheno-2H-cyclobuta[cd]pentalen-2-one, 1,1a,3,3a,4,5,5,5a,5b,6-decachlorooctahydro-
U247	72-43-5	Methoxychlor
U154	67-56-1	Methyl alcohol (I)
U029	74-83-9	Methyl bromide
U186	504-60-9	1-Methylbutadiene (I)
U045	74-87-3	Methyl chloride (I,T)
U156	79-22-1	Methyl chlorocarbonate (I,T)
U226	71-55-6	Methyl chloroform
U157	56-49-5	3-Methylcholanthrene
U158	101-14-4	4,4'-Methylenebis(2-chloroaniline)
U068	74-95-3	Methylene bromide
U080	75-09-2	Methylene chloride
U159	78-93-3	Methyl ethyl ketone (MEK) (I,T)
U160	1338-23-4	Methyl ethyl ketone peroxide (R,T)
U138	74-88-4	Methyl iodide

U161	108-10-1	Methyl isobutyl ketone (I)
U162	80-62-6	Methyl methacrylate (I,T)
U161	108-10-1	4-Methyl-2-pentanone (I)
U164	56-04-2	Methylthiouracil
U010	50-07-7	Mitomycin C
U059	20830-81-3	5,12-Naphthacenedione, 8-acetyl-10- [(3-amino-2,3,6-trideoxy)-alpha-L-lyxo-hexopy ranosyl) oxy-7,8,9,10-tetrahydro-6,8,11-trihydroxy-1-meth oxy-(8S-cis)-
U167	134-32-7	1-Naphthalenamine
U168	91-59-8	2-Naphthalenamine
U026	494-03-1	Naphthalenamine, N,N'-bis(2-chloroethyl)-
U165	91-20-3	Naphthalene
U047	91-58-7	Naphthalene, 2-chloro-
U166	130-15-4	1,4-Naphthalenedione
U236	72-57-1	2,7-Naphthalenedisulfonic acid, 3,3'-[(3,3'- dimethyl[1,1'-biphenyl]-4,4'-diyl)bis(azo)bis [5-amino-4-hydroxy]-, tetrasodium salt
U279	63-25-2	1-Naphthalenol, methylcarbamate
U166	130-15-4	1,4-Naphthoquinone
U167	134-32-7	alpha -Naphthylamine
U168	91-59-8	beta-Naphthylamine
U217	10102-45-1	Nitric acid, thallium(1+) salt
U169	98-95-3	Nitrobenzene (I,T)
U170	100-02-7	p-Nitrophenol

U171	79-46-9	2-Nitropropane (I,T)
U172	924-16-3	N-Nitrosodi-n-butylamine
U173	1116-54-7	N-Nitrosodiethanolamine
U174	55-18-5	N-Nitrosodiethylamine
U176	759-73-9	N-Nitroso-N-ethylurea
U177	684-93-5	N-Nitroso-N-methylurea
U178	615-53-2	N-Nitroso-N-methylurethane
U179	100-75-4	N-Nitrosopiperidine
U180	930-55-2	N-Nitrosopyrrolidine
U181	99-55-8	5-Nitro-o-toluidine
U193	1120-71-4	1,2-Oxathiolane, 2,2-dioxide
U058	50-18-0	2H-1,3,2-Oxazaphosphorin-2-amine, N,N-bis(2-chloroethyl)tetrahydro-, 2-oxide
U115	75-21-8	Oxirane (I,T)
U126	765-34-4	Oxiranecarboxyaldehyde
U041	106-89-8	Oxirane, (chloromethyl)-
U182	123-63-7	Paraldehyde
U183	608-93-5	Pentachlorobenzene
U184	76-01-7	Pentachloroethane
U185	82-68-8	Pentachloronitrobenzene (PCNB)
See F027[2]	87-86-5	Pentachlorophenol
U161	108-10-1	Pentanol, 4-methyl-

U186	504-60-9	1,3-Pentadiene (I)
U187	62-44-2	Phenacetin
U188	108-95-2	Phenol
U048	95-57-8	Phenol, 2-chloro-
U039	59-50-7	Phenol, 4-chloro-3-methyl-
U081	120-83-2	Phenol, 2,4-dichloro-
U082	87-65-0	Phenol, 2,6-dichloro-
U089	56-53-1	Phenol, 4,4'-(1,2-diethyl-1,2-ethenediyl)bis-, (E)-
U101	105-67-9	Phenol, 2,4-dimethyl-
U052	1319-77-3	Phenol, methyl-
U132	70-30-4	Phenol, 2,2'-methylenebis[3,4,6-trichloro-
U411	114-26-1	Phenol, 2-(1-methylethoxy)-, methylcarbamate
U170	100-02-7	Phenol, 4-nitro-
See F027[2]	87-86-5	Phenol, pentachloro-
See F027[2]	58-90-2	Phenol, 2,3,4,6-tetrachloro-
See F027[2]	95-95-4	Phenol, 2,4,5-trichloro-
See F027[2]	88-06-2	Phenol, 2,4,6-trichloro-
U150	148-82-3	L-Phenylalanine, 4-[bis(2-chloroethyl)amino]-
U145	7446-27-7	Phosphoric acid, lead(2+) salt (2:3)
U087	3288-58-2	Phosphorodithioic acid, O,O-diethyl S-methyl ester
U189	1314-80-3	Phosphorus sulfide (R)

U190	85-44-9	Phthalic anhydride
U191	109-06-8	2-Picoline
U179	100-75-4	Piperidine, 1-nitroso-
U192	23950-58-5	Pronamide
U194	107-10-8	1-Propanamine (I,T)
U111	621-64-7	1-Propanamine, N-nitroso-N-propyl-
U110	142-84-7	1-Propanamine, N-propyl- (I)
U066	96-12-8	Propane, 1,2-dibromo-3-chloro-
U083	78-87-5	Propane, 1,2-dichloro-
U149	109-77-3	Propanedinitrile
U171	79-46-9	Propane, 2-nitro- (I,T)
U027	108-60-1	Propane, 2,2'-oxybis[2-chloro-
U193	1120-71-4	1,3-Propane sultone
See F027[2]	93-72-1	Propanoic acid, 2-(2,4,5-trichlorophenoxy)-
U235	126-72-7	1-Propanol, 2,3-dibromo-, phosphate (3:1)
U140	78-83-1	1-Propanol, 2-methyl- (I,T)
U002	67-64-1	2-Propanone (I)
U007	79-06-1	2-Propenamide
U084	542-75-6	1-Propene, 1,3-dichloro-
U243	1888-71-7	1-Propene, 1,1,2,3,3,3-hexachloro-
U009	107-13-1	2-Propenenitrile

U152	126-98-7	2-Propenenitrile, 2-methyl- (I,T)
U008	79-10-7	2-Propenoic acid (I)
U113	140-88-5	2-Propenoic acid, ethyl ester (I)
U118	97-63-2	2-Propenoic acid, 2-methyl-, ethyl ester
U162	80-62-6	2-Propenoic acid, 2-methyl-, methyl ester (I,T)
U373	122-42-9	Propham
U411	114-26-1	Propoxur
U387	52888-80-9	Prosulfocarb
U194	107-10-8	n-Propylamine (I,T)
U083	78-87-5	Propylene dichloride
U148	123-33-1	3,6-Pyridazinedione, 1,2-dihydro-
U196	110-86-1	Pyridine
U191	109-06-8	Pyridine, 2-methyl-
U237	66-75-1	2,4-(1H,3H)-Pyrimidinedione, 5-[bis(2- chloroethyl)amino]- 4(1H)-Pyrimidinone, 2,3-dihydro-6-methyl-2-thioxo-
U164	56-04-2	4(1H)-Pyrimidinone, 2,3-dihydro-6-methyl-2-thioxo-
U180	930-55-2	Pyrrolidine, 1-nitroso-
U200	50-55-5	Reserpine
U201	108-46-3	Resorcinol
U202	[1]81-07-2	Saccharin, & salts
U203	94-59-7	Safrole
U204	7783-00-8	Selenious acid

U204	7783-00-8	Selenium dioxide
U205	7488-56-4	Selenium sulfide
U205	7488-56-4	Selenium sulfide SeS_2 (R,T)
U015	115-02-6	L-Serine, diazoacetate (ester)
See F027[2]	93-72-1	Silvex (2,4,5-TP)
U206	18883-66-4	Streptozotocin
U103	77-78-1	Sulfuricacid, dimethyl ester
U189	1314-80-3	Sulfur phosphide (R)
See F027[2]	93-76-5	2,4,5-T
U207	95-94-3	1,2,4,5-Tetrachlorobenzene
U208	630-20-6	1,1,1,2-Tetrachloroethane
U209	79-34-5	1,1,2,2-Tetrachloroethane
U210	127-18-4	Tetrachloroethylene
See F027[2]	58-90-2	2,3,4,6-Tetrachlorophenol
U213	109-99-9	Tetra hydrofuran (I)
U214	563-68-8	Thallium(I) acetate
U215	6533-73-9	Thallium(I) carbonate
U216	7791-12-0	Thallium(I) chloride
U216	7791-12-0	Thallium chloride TlCl
U217	10102-45-1	Thallium(I) nitrate
U218	62-55-5	Thioacetamide

U410	59669-26-0	Thiodicarb
U153	74-93-1	Thiomethanol (I,T)
U244	137-26-8	Thioperoxydicarbonic diamide $[(H_2N)C(S)]_2S_2$, tetramethyl-
U409	23564-05-8	Thiophanate-methyl
U219	62-56-6	Thiourea
U244	137-26-8	Thiram
U220	108-88-3	Toluene
U221	25376-45-8	Toluenediamine
U223	26471-62-5	Toluene diisocyanate (R,T)
U328	95-53-4	o-Toluidine
U353	106-49-0	p-Toluidine
U222	636-21-5	o-Toluidine hydrochloride
U389	2303-17-5	Triallate
U011	61-82-5	1H-1,2,4-Triazol-3-amine
U227	79-00-5	1,1,2-Trichloroethane
U228	79-01-6	Trichloroethylene
U121	75-69-4	Trichloromonofluoromethane
See F027[2]	95-95-4	2,4,5-Trichlorophenol
See F027[2]	88-06-2	2,4,6-Trichlorophenol
U404	121-44-8	Triethylamine
U234	99-35-4	1,3,5-Trinitrobenzene (R,T)

U182	123-63-7	1,3,5-Trioxane, 2,4,6-trimethyl-
U235	126-72-7	Tris(2,3-dibromopropyl) phosphate
U236	72-57-1	Trypan blue
U237	66-75-1	Uracil mustard
U176	759-73-9	Urea, N-ethyl-N-nitroso-
U177	684-93-5	Urea, N-methyl-N-nitroso-
U043	75-01-4	Vinyl chloride
U248	[1]81-81-2	Warfarin, & salts, when present at concentrations of 0.3% or less
U239	1330-20-7	Xylene (I)
U200	50-55-5	Yohimban-16-carboxylic acid, 11,17-dimethoxy-18- [(3,4,5-trimethoxybenzoyl) oxy]-, methyl ester,(3beta,16beta, 17alpha,18beta,20alpha)-
U249	1314-84-7	Zinc phosphide Z_3P_2, when present at concentrations of 10% or less

[1]CAS Number given for parent compound only.

[2]F027 wastes are discarded unused formulations containing tri-, tetra-, or pentachlorophenol or discarded unused formulations containing compounds derived from these chlorophenols. This listing does not include formulations containing Hexachlorophene synthesized from pre-purified 2,4,5-trichlorophenol as the sole component. F027 wastes are acutely hazardous wastes and are subject to the same exclusion limits as P-listed wastes.

NOTE: The primary hazardous properties of these materials have been indicated by the letters T (Toxicity), R (Reactivity), I (Ignitability) and C (Corrosivity). Absence of a letter indicates that the compound is only listed for toxicity.

Appendix C: Peroxidizable Compounds

List I – Severe Peroxide Hazard

Butadiene[1]

Chloroprene[1]

Divinyl ether

Isopropyl ether

Potassium amide

Potassium metal

Sodium amide (sodamide)

Tetrafluoroethylene[1]

Vinylidene chloride

List II – Concentration Hazard

Acetal

Acetaldehyde

Benzyl alcohol

2-Butanol

Cumene

Cyclohexanol

Cyclohexene

2-Cyclohexen-1-ol

Decahydronaphthalene (decalin)

Diacetylene (butadiyne)

Dicyclopentadiene

Diethylene glycol dimethyl ether (diglyme)

Diethyl ether (ether)

Dioxanes

Ethylene glycol ether acetates (glyme)

Furan

4-Heptanol

2-Hexanol

Methylacetylene[2]

3-Methyl-1-butanol

Methyl cyclopentane

Methyl isobutyl ketone

4-Methyl-2-pentanol

2-Pentanol

4-Penten-1-ol

1-Phenylethanol

2-Phenylethanol

Tetrahydrofuran (THF)

Tetrahydronaphthalene (tetralin)

Vinyl ethers

Other secondary alcohols

List III – Shock and Heat Sensitive

Acrylic acid

Acrylonitrile

Butadiene[2]

Chlorobutadiene

Chloroprene[2]

Chlorotrifluoroethylene[2]

Methyl methacrylate

Styrene

Tetrafluoroethylene[2]

Vinyl acetate

Vinylacetyline[2]

Vinyladiene chloride

Vinyl chloride[2]

Vinyl pyridine

[1]When stored as a liquid monomer.

[2]Can form explosive levels of peroxides when stored as a liquid. When stored as a gas, these chemicals may autopolymerize as a result of peroxide accumulation.

NOTE: The above lists include the most commonly known peroxidizable compounds. Refer to the chemical SDS (or other reference) for the peroxide-forming potential of the material you are using.