GUIDELINES:
HANDLING AND DISPOSAL OF CHEMICALS

Purdue University Chemical Management Committee
Radiological and Environmental Management

Adopted April 1990
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RADIOLOGICAL AND ENVIRONMENTAL MANAGEMENT

IN CASE OF EMERGENCY CALL 911

GENERAL INFORMATION	**49-46371**
FAX	**49-47403**

CONSTRUCTION HEALTH & SAFETY
Asbestos Abatement, Project Planning, Lead Abatement, Multi-Employer Worksite Safety — **49-61937**

ENVIRONMENTAL HEALTH
Blood borne Pathogens, Public Health, Food Safety, Biosafety, TB Awareness and Potable Water — **49-41496**

FAX	**49-62572**

HAZARDOUS MATERIALS MANAGEMENT
Chemical & Biological Waste Management, Spill Response, Training, and Consultation — **49-40121**

FAX	**49-61106**

INDUSTRIAL HYGIENE
Hazard Communication, Lead Management, Confined Space, Lab Safety, Indoor Air — **49-40204**

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Radioactive Material Ordering, Disposal, Training & Safety Consultant — **49-47969**

SAFETY COORDINATION
General Safety, OSHA, Ergonomics, Building Inspections and Safety Training — **49-41430**

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http://www.purdue.edu/rem

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INTRODUCTION

The major professor, principal investigator, researcher, or supervisor has the ultimate responsibility for ensuring their units comply with environmental, health and safety regulations; and related University policies, procedures, and instructions. At least one member of their group must be designated to be responsible for hazardous waste management. They should follow all of the procedures in these guidelines and provide proper instruction to personnel under their supervision.

Hazardous waste is any material solid, liquid, or gas that exhibits a hazardous characteristic, or is a specifically listed material as defined under the hazardous waste regulations. Hazardous waste characteristics include ignitability, corrosivity, reactivity, and toxicity. Listed hazardous waste includes waste from non-specific sources, waste from specific sources, discarded unused chemicals, commercial products, and spill residues.

The Resource Conservation and Recovery Act (RCRA[1]) passed by the United States Congress, mandates the proper handling and disposal of hazardous waste. The United States Environmental Protection Agency (EPA) authorized by RCRA administers the regulations found in Title 40 of the Code of Federal Regulations[2] to ensure proper identification, handling, storage, and disposal of hazardous waste for protection of human health and the environment. In addition to federal regulations, the state of Indiana also regulates hazardous waste. The Indiana Department of Environmental Management (IDEM) administers the hazardous waste compliance program in Indiana. This combination of federal and state rules, regulations, and procedures govern the management of hazardous waste from the point of generation to the point of final disposition (also known as "Cradle to Grave Management").

Purdue University is a large quantity generator of hazardous waste and operates a fully permitted Treatment, Storage, and Disposal Facility (TSDF). As such, the University is subject to the most stringent hazardous waste management regulations. The disposal of hazardous waste requires a system of policies and procedures to protect human health and the environment, and to ensure compliance with governmental regulations. It is essential that each individual that generates hazardous waste at Purdue University comply with the rules, policies, and procedures stated in the following document.

Purdue University has a system to manage all hazardous waste generated at the West Lafayette, Indiana campus. Each individual generator collects and accumulates their waste in proper containers at or near the point of generation without accumulating more than 55 gallons of waste at one time. When items are ready for pickup, the generator certifies the identity of the waste by completing and submitting a Hazardous Material Pickup Request form to the Purdue University Radiological and Environmental Management Department (REM). REM processes and checks the request for compliance, safety and completeness. The processed form accompanies REM personnel when they pick up the waste from individual generator areas and transport it to Purdue's TSDF. REM staff commingles a majority of the waste with other compatible waste into drums. Once in drums, a contractor transports the waste to a variety of off-site treatment and disposal facilities. For each waste stream, Purdue selects a facility for the final treatment and disposal method that best protects human health, the environment, and natural resources.

Purdue University's commitment to comply with all applicable environmental health and safety regulations as well as the protection of human health and the environment can only happen when everyone takes responsibility for their own waste. Requirements for hazardous waste generators are simple: collect hazardous waste in containers that are compatible with the waste, in good condition, have a proper closure device; and properly label each container with all the chemical constituents that it contains. Proper and effective management of hazardous wastes is important to everyone because it protects us from exposure to harmful chemicals, disease, and illness. Good management practices also help us have cleaner water, cleaner air, abundant wildlife, safe food supplies, and a good quality of life. To achieve this requires that every individual involved in hazardous waste management at Purdue take responsibility by fulfilling his or her role as outlined in this document.

HAZARDOUS WASTE DEFINED

In order for a material to be classified as a hazardous waste, it must first be a “solid waste”. RCRA defines a solid waste as garbage, refuse, sludge, industrial waste, or other discarded materials. The term “solid waste” is very broad and includes both non-hazardous and hazardous waste but is not limited to wastes that are physically solid. Many solid wastes are liquid, semisolid, or gas.

A hazardous waste is a waste with properties that make it dangerous or capable of having a harmful effect on human health or the environment. There are two criteria to determine if the solid waste is hazardous waste. First, determine if the waste exhibits certain characteristics that can cause death, injury, or illness in humans or lead to ecological damage. Second, determine if the waste is a listed hazardous waste.

Wastes may be hazardous if they are specifically listed by the Environmental Protection Agency (EPA). There are four EPA lists for hazardous waste: the F list, the P list, the K list, and the U list. The F list includes wastes from nonspecific sources. At Purdue, the most common F listed waste is waste generated from the use of solvents. This includes waste mixtures of solvents, waste solvents, and media mixed with solvents, such as rags for cleaning. The F list is codified in the regulations at 40 CFR 261.31.[3]

The K list includes wastes generated from specific industrial process. The K list is found at 40 CFR 261.32. The P list and the U list include pure or commercial grade formulations of specific unused chemicals. Chemicals are included on the P list if they are acutely toxic. The U list is generally comprised of chemicals that are toxic, but also includes chemicals that display other characteristics, such as ignitability, corrosivity, or reactivity. Both the P list and U list are codified at 40 CFR 261.33.

Waste may also be hazardous if it exhibits a particular hazardous characteristic. The four hazardous characteristics are ignitability, corrosivity, reactivity, and toxicity. The ignitability characteristic identifies wastes that can readily catch fire and sustain combustion. Ignitable wastes carry the waste code D001. The corrosivity characteristic (D002) identifies wastes that are acidic or alkaline (basic) and can readily corrode or dissolve flesh, metal, or other materials[4]. The reactivity characteristic (D003) identifies wastes that readily explode or undergo violent reactions. The EPA developed the toxicity characteristic (TC) to identify wastes likely to leach dangerous concentration of toxic chemicals into ground water. Specific constituents that exhibit the toxicity characteristic are listed in Table V and identified by EPA waste numbers D004 through D043

GENERAL SAFETY GUIDELINES FOR HAZARDOUS WASTE MANAGEMENT

- ❑ Determine if you generate a hazardous waste.
- ❑ Designate one member of your group to be responsible for hazardous waste management.
- ❑ Establish and identify an area to accumulate hazardous waste near the point of generation.
- ❑ Identify and separate the hazardous waste by hazard class.
- ❑ Do not mix waste streams.
- ❑ Select an appropriate container for the waste.
- ❑ Label all the hazardous waste containers with the words “HAZARDOUS WASTE” and the chemical name and percent composition of each constituent.
- ❑ The chemical waste containers must be tightly capped at all times, except when adding waste.
- ❑ Segregate containers according to compatibility.
- ❑ For the removal of the chemical waste, send to REM a complete Hazardous Material Pickup Request form (HMM-001).
- ❑ Include the chemical name or description of each constituent in the waste with the percent composition.
    - ❍ With the exception of the compounds listed by EPA as D004 through D043 (Table V), that must be included even in trace amounts, only the most abundant 5-10 species need to be listed for mixtures of numerous components
- ❑ If the pickup request includes trade products, include the product MSDS with the Hazardous Material Pickup Request form.
- ❑ Call REM at 49-40121 for further information.
- ❑ Call Purdue Police at 911 in an emergency.

HAZARDOUS WASTE STORAGE*

The following section describes the requirements for accumulation and storage of hazardous waste in your area.

I. CONTAINERS

A. All waste must be in containers.

Select an appropriate and compatible container for the waste. Usually the original container of the main component of the waste can be used. However, do not use metal containers for corrosive waste or glass containers for waste containing hydrofluoric acid. For liquid waste, use a container designed for liquids.

B. Generators must supply their own containers.

C. Cap and close containers at all times.

The chemical waste container MUST be tightly capped at all times except when adding waste. Open containers allow evaporation, invite spills, and are an improper means of storage.

D. All containers must be in good condition and not leaking.

Containers must be clean, without chemical residue on the outside, leak proof, and have an appropriate lid to secure the contents of the container. If a container holding hazardous waste is not in good condition, or if it begins to leak, the generator must transfer the hazardous waste to a container that is in good condition. Alternatively, over pack the container that is leaking or in poor condition into a larger compatible container with a tight fitting lid. If leaks or spills occur, all evidence of leakage and all spilled material must be immediately and properly cleaned-up. Collect all spilled materials and debris used for clean up as a hazardous waste.

E. All containers must be under the control of the generator and stored in a manner that will not cause them to spill or leak.

Close all containers with an appropriate lid, cap, or other suitable device that is compatible with and that will contain the waste during normal handling and storage. Store containers upright and place securely on a shelf, floor, or countertop. Do not place containers in areas such as hallways, doorways, sinks, or next to moving equipment where the chance of spills is likely. Never locate containers in public areas such as hallways, classrooms, or reception areas.

F. All containers must be stored in a manner that readily allows for inspection.

II. LABEL ALL CONTAINERS CONTAINING HAZARDOUS WASTE

A. Label all hazardous waste containers with the words **"HAZARDOUS WASTE"** and the chemical name and percent composition of the compounds. HAZARDOUS WASTE labels (Figure 1) are available by calling 40121.

B. When the waste container is full, or when removal is desired, a label containing **the percent composition of all constituents must be affixed**. For mixtures with numerous constituents, only the most abundant 5-10 species need to be listed unless the mixture contains one of the compounds listed by EPA as D004 through D043 (Table V). These constituents must be included even in trace amount.

C. The manufacture's label is sufficient for discarded or unwanted pure chemicals and trade products in their original container.

III. SEGREGATE WASTE ACCORDING TO COMPATIBILITY

Chemicals should be segregated according to compatibility for laboratory storage (Table I). For example, segregate acids from bases and segregate oxidizers from fuels, solvents, and other organics**.** Carefully read the manufacturer's label and MSDS sheet for information on safe storage and incompatibilities. Storage of materials by hazard grouping reduces the risk of fire or explosive reactions.

* **EPA conducts an unannounced annual inspection of Purdue labs and work areas. Central to this inspection is proper storage and labeling of accumulation containers. Violation of RCRA Regulations is punishable by fines of up to $31,250 per day per violation.**

SATELLITE ACCUMULATION AREA

I. DEFINITION

A satellite accumulation area (SAA) is a designated area within the laboratory or shop, which will store the hazardous waste until it is sent out for processing. The SAA must be at or near the point of generation. Waste within the SAA must be capped, labeled, and under the control of the generator. General access to your waste must be restricted: this means waste cannot be stored in hallways, walkways, or common areas.

II. WHY DOES PURDUE USE SAA'S FOR HAZARDOUS WASTE MANAGEMENT?

Purdue University uses SAA's to manage waste in laboratories and shops because it provides a safe and effective means to accumulate hazardous waste before removal to the University's TSDF. Additionally, SAA's are the *least restrictive* regulatory option for accumulation and storage of waste at or near the point of generation.

III. HOW TO DESIGN YOUR SAA

A. Location must be at or near the point of generation.

Establish an area to accumulate hazardous waste. This area can be a bench top, a fume hood, or a previously empty cabinet. The SAA must be at or near the point of generation and under the control of the operator generating the waste. Separate SAA's may be used for each waste stream. If multiple SAA's are used in the area, they must be clearly identified by boundaries and signage indicating the waste stream.

B. Regulations applicable to SAA:

Hazardous waste management at the University is regulated by the Indiana Department of Environmental Management (IDEM) and by the U.S. Environmental Protection Agency (EPA). State and federal regulations mandate the following regarding chemical waste:

1. Waste in SAA's must be kept in containers.
2. Containers must be in good condition.
3. Containers must be labeled or clearly marked with the words "HAZARDOUS WASTE" and with the contents of the container from the start of accumulation.
4. Containers must be compatible with the waste and suitable for transportation.
5. Containers must be properly capped **at all times** except when adding to or pouring off waste material.
6. Handle containers to avoid rupture or leakage.
7. SAA's must never exceed 55 gallons of chemical waste or one quart of acutely toxic chemical waste.
8. All spills and leaks must be cleaned-up immediately.
9. All persons using the SAA must be familiar with the emergency procedures. Call 911 in the event of an emergency (Emergency Response Procedures, p.17).
10. Make a good faith effort to minimize waste.

C. Segregation by chemical compatibility:

Collect waste streams in separate containers. Acids, bases, heavy metals, carcinogens, oxidizers, cyanides, sulfides, pesticides, halogenated organic solvents, non-halogenated organic solvents and especially mercury materials should be separated. Mixing chemical waste streams negatively impacts environmentally sound disposal options, and greatly increases disposal costs. Radioactive wastes must be kept separate. Call 40121, if you have any question about accumulating hazardous waste.

D. Submit frequent pick up requests. This will reduce the amount of waste in your area and provide a safer work environment.

E. Designate a person to be directly responsible for the SAA.

The researcher or director of the facility must designate at least one member of their group to be responsible for hazardous waste management. This person must ensure all personnel follow the procedures described in this guideline and know the exact location of the SAA and the waste that it contains.

PICKUP REQUEST

I. REQUESTING CHEMICAL REMOVAL

The removal of hazardous waste at Purdue University is initiated by the pickup request. The pickup request documents the generator's knowledge of the waste and the hazardous constituents contained therein. REM personnel cannot remove waste without first receiving and processing the generators Hazardous Material Pickup Request form. The form also serves as a manifest used to transport the materials from your area to Purdue's permitted waste facility. This document is maintained in Purdue's Hazardous Waste Management operating records and is open to inspection by the U.S. EPA. Use the following procedures in conjunction with completing and submitting a Hazardous Material Pickup Request form in order to have your hazardous waste removed by REM staff:

A. Label all the hazardous waste containers with the words "HAZARDOUS WASTE" and the chemical name with percent composition for each constituent. The description on the container's label should be identical to that listed on the Hazardous Material Pickup Request form. Orange labels for hazardous waste (Figure 1a) are available from REM upon request.

B. Tightly cap all containers ready for pickup.

C. Ensure the outside of the container is clean and free of residue.

D. Complete Hazardous Material Pickup Request form (Figure 2). Forms are available by calling 40121, or on REM website.

   1. For each container, list the description of the waste including the chemical name of each compound with the percent composition. The description should be identical to that on the container label. Acronyms, abbreviations, and formulae are not acceptable chemical names.

   2. For mixtures of numerous constituents, only the most abundant 5-10 species need to be listed with the exception of the compounds listed by EPA as D004 through D043 (Table IV) that must be included even in trace amounts.

   3. If the pickup request includes trade products (e.g. Alconox Laboratory Detergent, Comet Cleanser, etc.), include the product MSDS with the Hazardous Material Pickup Request form.

E. To submit a completed Hazardous Material Pickup Request (Figure 4) form to REM use campus mail, FAX, or an online form. Campus mail to REM LMSB. FAX to 49-61106.

II. REMOVAL OF MATERIAL BY REM STAFF

A. REM Staff will inspect containers for compliance and safety before removal of materials

   1. Proper container and label
   2. Proper cap
   3. Labels match description on Hazardous Material Pickup Request form
   4. Clean outer surface
   5. Container is not leaking

B. Materials may be rejected for pickup for the following reasons:

1. Leaking or overfilling container.
2. Improper caps/lids.
3. Mislabeled containers:
    a. No label
    b. Use of formulas, abbreviations
    c. Label does not match Hazardous Material Pickup Request form
    d. Label description does not match the contents of containers.
4. Contaminated containers.

C. If requested, reusable storage containers of 5 gallons or larger or special hazardous waste containers may be returned to the generator's area. Mark the container clearly with "RETURN TO", the building, and room number. Containers unsuitable for reuse will be properly disposed of and not returned.

WASTE MINIMIZATION

Waste minimization is any action that reduces the amount and/or toxicity of chemical hazardous wastes before they are shipped off-site for disposal. The U.S. Congress mandates, through the Resource Conservation and Recovery Act (RCRA), waste minimization practices for large quantity hazardous waste generators such as Purdue University. At the time of each off campus shipment of hazardous waste, the REM department certifies under penalty of law that Purdue has an active waste minimization policy. Purdue's Waste Minimization Policy focuses on the efforts of each generator who is most familiar with the process generating their waste. To document this practice the Chemical Management Committee (CMC) requires each principal investigator to certify their waste minimization efforts before waste may be removed from their area. REM staff will initiate the certification paperwork upon the first Hazardous Material Pickup Request form submittal and notify the principal investigator for annual renewal of certification.

There is clear intent in RCRA, the Clean Air Act, and the Pollution Prevention Act to practice source reduction and recycling as preferred environmental management approaches over the treatment, disposal, or release of harmful chemicals to the environment. The CMC adopts and recommends the U.S. Environmental Protection Agency hierarchy of waste minimization approaches*: source reduction, recycling, and treatment*.

I. SOURCE REDUCTION

The most desirable method of waste minimization is source reduction, which reduces the impact of chemical wastes on the environment to the greatest extent. This activity reduces or eliminates the generation of chemical waste at the source.

A. Product Substitution: Substitute hazardous materials with less toxic or non-hazardous compounds, such as using non-mercury alternatives for thermometers, gas bubblers, and other devices.

B. Micro-scale analytical techniques and experimentation should be used where practicable.

C. Purchase only in quantities necessary for immediate use. Large portions of the hazardous waste generated at the University are unused chemicals in their original containers. In some cases, disposal costs exceed the purchase price. Other recommendations for responsible chemical purchasing include:

1. Designate a single person to be responsible for purchasing chemicals.
2. Maintain current chemical inventories.
3. Review inventories before purchasing additional chemicals.
4. Establish a departmental distribution system for usable chemicals.
5. Purchase compressed gas cylinders or lecture bottles only from manufactures that will accept the empty cylinders back.
6. Redistribute unwanted usable chemicals to other legitimate users within the University.
7. Segregate non-hazardous wastes from hazardous wastes. If hazardous waste is mixed with non-hazardous waste, the entire resulting mixture must be managed as hazardous waste.

II. RECYCLING

The second most desirable approach is waste minimization through recycling. Waste materials are recycled when they are used for another purpose, treated and reused in the same process, or reclaimed for another process.

A. Used oil, batteries, mercury, fluorescent tubes, precious metals, and computer monitors are managed for off-site recycling by REM. Call 40121 for more details on these processes.

B. Recover, redistill, and reuse organic solvents: Distill and reuse solvents for classroom experiments or as cleaning agents where ultra pure solvent is not required.

III. TREATMENT

"Treat" material to remove the characteristic of ignitability, corrosivity, reactivity, or toxicity. A common laboratory treatment is elementary neutralization. Perform treatments only if you are familiar with the chemical reaction and the associated products.

LABORATORY DECOMMISSIONING

I. POLICY

Abandoned chemicals in laboratories create unsafe and non-compliant conditions. Additionally, these "orphan" materials are expensive and time consuming to manage. Therefore, it is imperative principal investigators and laboratory staff take responsibility for properly decommissioning their laboratories. Before leaving your laboratory or assigned space, all unwanted chemicals, research samples, and chemical waste must be disposed following the normal hazardous material pickup request process. Please note that you are responsible for all materials in your area including materials you purchased, created, or may have inherited from former laboratory occupants. Failure to take responsibility for your materials leaves abandoned materials that become the responsibility of the department, and are typically left for the next laboratory occupant. The role of REM is to provide consultation and assistance with the decommissioning process. We will ease the process as much as practicable, and then remove the materials once we receive the pick up request. If materials are abandoned by laboratory occupants, it is the department's responsibility to identify unwanted materials, and prepare and submit a Hazardous Material Pickup Request form for those materials.

II. PROCEDURES

The need for laboratory decommissioning typically comes about when researchers leave the University, relocate to another laboratory, or remodel. The decommissioning process can be time consuming for the researcher, but is necessary to maintain a safe and healthy work environment. The following are recommendations to ease the process as much as possible:

A. Develop a departmental or school policy regarding proper laboratory decommissioning procedures.

B. Assign an individual, such as the Department Safety Committee Chair, to ensure researchers have properly decommissioned their laboratories before leaving.

C. For consultation and decommissioning assistance, contact REM HMM Section at 40121.

D. Plan. The decommissioning process can take days to months. If there are time-driven deadlines, contact us as soon as possible, so we may assist you in meeting your deadlines.

E. Unwanted materials must be submitted for pickup on a *Hazardous Material Pickup Request* form. A form can be found on the REM web site by using the link on the Hazardous Materials Management section of the *REM Forms* page or by request at 40121.

(http://www.purdue.edu/rem/home/forms)

F. All materials must be properly labeled and in appropriate containers with tight fitting lids.

G. Segregate unknown materials and submit on a separate *Hazardous Material Pickup Request* form.

H. Make every effort to redistribute legitimate, useable materials to other researchers in the department.

I. Maintain current chemical inventories for each laboratory.

J. Do not create chemical caches. Buy only what you need.

K. Practice good laboratory hygiene.

L. Label and identify everything.

M. Submit pickup requests often.

N. Segregate materials by hazard class.

O. Do not store or mix radioactive and chemicals in the same area, unless intrinsic to the procedure.

P. Contact REM at 40121 for assistance.

EMPTY CONTAINERS

Purdue's policy for the disposal of empty containers is implemented to protect Purdue facilities and the Physical Facilities Buildings and Grounds staff when removing trash. Please remember that although chemical residues may be non-hazardous by themselves, they may mix with other incompatible residue in the dumpster or compactor causing a reaction or fire. In addition, sealed containers may become pressurized during compaction, which may result in residues spraying onto workers. Please keep the following procedures and information in mind when disposing of empty containers:

- ❑ Triple rinse empty containers with a solvent capable of removing the original material.
- ❑ Collect the rinsate for disposal through REM unless it is non-hazardous and safe for sink disposal. (See page 20, "Non-Hazardous Waste", or call REM at 40121 for assistance with determining non-hazardous waste.)
- ❑ Identify triple-rinsed, dry, odorless, and empty containers as "SAFE FOR DISPOSAL" with a label available from REM or by defacing the original label.
- ❑ Remove any cap that may cause the container to become pressurized when compacting.
- ❑ Arrange removal of these containers with the Building Services staff in your area or transport these containers yourself to the designated area beside the dumpster outside your building.
- ❑ If you are unable to remove residual hazardous materials from containers, submit these to REM for pickup using the Hazardous Material Pickup Request form.
- ❑ Contact REM with any questions you may have at 40121 or 40238.

EMERGENCY RESPONSE PROCEDURES

Written emergency response procedures are required by several regulatory agencies and by university policy. As a waste generator, you are required to establish emergency procedures relating to hazardous waste incidents. Some common incidents may include spills and releases of hazardous materials, exposure to hazardous materials, or incidents involving fire or explosion. Your procedures for emergency response should be simple and universal. REM recommends the minimum of evacuation and calling 911. Purdue Police receive all calls 24 hours a day and will dispatch the appropriate responders.

The following guidelines are established to assist you develop emergency procedures for your area. First, you must assess if the incident constitutes an emergency. If it is an emergency then you must follow the Emergency Response procedures posted in your area. The following are recommendations for emergency and non-emergency procedures.

I. SPILL ASSESSMENT AND RESPONSE

A. Initial spill assessment requires knowledge of the hazards and recognition of when additional assistance is necessary. Determine the nature of the emergency: a high hazard or minimal hazard-working situation. According to the Purdue Chemical Hygiene Plan and Hazardous Materials Safety Manual[5] a high hazard emergency is immediately dangerous to life and health, involves a large area, major injury to personnel, is a threat to personnel and the public, involves a radioactive material, involves an infectious agent; or involves a highly toxic, corrosive, or reactive hazardous material. In addition, the release of hazardous material to the sewer or environment (i.e. soil or body of water) is an emergency.

B. Small spills or routine spills that do not expose personnel, and that are not included in the high hazard spill description do not constitute an emergency. Usually, the personnel involved can handle the spill clean up. For additional information or if the personnel do not feel comfortable with spill clean up, call REM 40121 or 911 for assistance.

C. Request outside help when a spill requires special training, procedures, or equipment (PPE) that is beyond the abilities of present personnel. Follow the procedures listed below.

II. EMERGENCY INSTRUCTIONS

A. Cease all activities.

B. Evacuate the spill area.

C. Pull fire alarm if building evacuation is required.

D. Call 911.

E. Seek immediate medical attention, if necessary.

F. If possible, call REM at 40121.

G. Keep people out of the spill area.

H. Do not re-enter the area, until emergency responders advise that it is safe to do so.

I. Account for all employees and report missing persons to the emergency personnel.

III. SPILLS - NON-EMERGENCY PROCEDURES

Clean-up Techniques for Small Spills: In general, small spills should be absorbed, neutralized, and collected. Proper PPE should be worn when cleaning up spills. This should include at a minimum gloves, goggles, and a laboratory coat. Consult the MSDS for specific instructions on spill response. The instructions below are general guidelines only and may need to be modified to safely handle the spill. Decontamination of the spill area with a mild soap solution may also be necessary. For questions regarding procedures, call REM at 40121. Additional information is available from the Hazard Communication at Purdue University-Written Compliance Manual[6] ("Right to Know") and Purdue Chemical Hygiene Plan and Hazardous Materials Safety Manual.

A. Liquids

Liquid spills should be covered with a spill control mix, vermiculite, or other inert absorbents to contain and absorb the material. Cover the spill area with absorbent. Mix thoroughly until all liquid is absorbed. Collect the solid into a heavy-walled plastic bag or other suitable container. Properly label the spill debris and other waste generated in the cleanup. Submit a Pickup Request for disposal. Buckets of spill mix (Sodium Carbonate - kitty litter- sand) are available in stockrooms (West Lafayette Campus).

Note: Call REM for spills of liquid oxidizing agents (40121) or 911.

B. Caustic Solids

Collect and dissolve material in a beaker. Neutralize the base solution with dilute acid to a pH of 5-9. Flush the resulting salt solution down the sink drain with large amounts of water, if the material is listed in Table III. Delay in clean-up may allow the spilled solid to absorb moisture from the atmosphere and increase the difficulties of clean up. Flush contaminated areas with water and neutralize with an appropriate dilute acid.

C. Mercury Spills

Small mercury spills, such as a thermometer break, can be cleaned up by laboratory personnel. Collect all droplets and pools by means of a suction pump and aspirator bottle with a long capillary tube. Mercury absorbent sponges can be purchased to soak up mercury droplets. All collected mercury and mercury-contaminated debris must be sent to REM for disposal.

Personnel may call REM (40121) for any mercury spills. REM Staff will utilize specialized equipment to safely and easily clean up mercury (West Lafayette Campus).

HAZARDOUS MATERIAL SHIPPING

The REM Department provides hazardous material (HAZMAT) shipping services for off-campus shipments only of Hazardous Materials. Purdue University must comply with Department of Transportation (DOT) regulations. DOT regulations require hazardous materials to be properly classified, described, packaged, marked, labeled, and manifested prior to shipment.

If you need to ship or transport a hazardous material off campus, please contact the Materials Management Shipping Office (67367) or the REM Hazardous Material Management section (40121).

In addition, DOT regulations require training for any individual who engages in the following activities:

- ❑ Loads, unloads, or handles hazardous materials in transportation
- ❑ Reconditions or tests containers, drums, or packages represented for use in the transportation of hazardous materials
- ❑ Prepares hazardous materials for transportation
- ❑ Prepares, reviews, or types manifests (shipping papers) for hazardous materials shipment
- ❑ Is responsible for safety of transported hazardous materials
- ❑ Operates a vehicle (including personal vehicle) used to transport hazardous materials.

This training is mandatory within 90 days of employment and requires re-certification every two years. Contact REM (40121) if you perform one or more of the above duties and have not received DOT specific training.

TABLE I: CHEMICAL COMPATIBILITY CHART

#	Group Name	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
1	Acid, Non Oxidizing	1																				
2	Acid, Oxidizing		2																			
3	Acid Organics		GH	3																		
4	Aldehyde	HP	FH	HP	4																	
5	Amine, Amide	H	HT	H	H	5																
6	Azo/Diazo/Hydrazine	GH	HT	GH	H		6															
7	Caustic	H	H	H	H			7														
8	Cyanide	IT	IT	IT			G		8													
9	Ester	H	FH				GH	H		9												
10	Halogenated Organics	HT	HFT			HT	GH	HI	H		10											
11	Ketone	H	FH				GH	H	H			11										
12	Mercaptans/Sulfides	IT	FHT				GH				H	H	12									
13	Elemental Alkali & Alkali Earth Metals	FHI	FHI	FHI	FHI	HI	HI	HI	HI	HI	EH	HI	HI	13								
14	Nitride	FHI	FHT	H							HI	HI	HI	E	14							
15	Nitro Compound, Organic		FHT		H			EH						EHI	EHI	15						
16	Peroxide & Hydroperoxide	GH	EH		HG	HT	EFH		EHT		EH	E	FHT	EH	EHI		16					
17	Phenol & Cresol	H	FH				GH							HI	HI		H	17				
18	Sulfide, Inorganic	IT	FHT	GT	H		E										HT		18			
19	Combustible & Flammable	HG	FHT											FGH	FHI		FHT			19		
20	Explosive	EH	EH	EH			EH	EH		EH				EH	E		EH	EH	EH	EH	20	
21	Oxidizing Agent, Strong	HT		HT	FH	FHT	EH		EHT	FH	HT	FH	FHT	FH	EFH	EH	GH	EH	FHT	FGH	EH	21
22	Reducing Agent, Strong	HI	FHT	HI	FHI	HI	GH			EH	EH	HI	HI			EH	EH	HI		HI	EH	EFH
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21

Table II KEY

E = Explosion
F = Fire
G = Non-Hazardous Gas
H = Heat
I = Flammable Gas Generation
P = Polymerization
T = Toxic Gas Generation

NON-HAZARDOUS WASTE

Small quantities of the following materials and those in the following table may be safely disposed of via the sanitary sewer if soluble in water or via the trash if water insoluble. The examples below do not include every non-hazardous substance, or every material that can be disposed of via the sanitary sewer or trash. Please call REM (ext. 40121) for further information.

I. MATERIALS FOR SEWER DISPOSAL:

A. First, completely dissolve the material in water. If the material does not completely dissolve, it cannot be disposed through the sewer.

B. The pH of the resulting solution must be between pH 5 and 9 or neutralized to within the same pH range using an appropriate acid or base that is also safe for the sanitary sewer.

II. MATERIALS FOR TRASH DISPOSAL:

A. Must contain no residual flammable solvents or toxic chemicals and must be odorless.

B. Must pose no dust hazard.

C. Must be clearly marked "Non-Hazardous" and securely packaged before placing in the trash.

D. No liquids may be trash disposed.

TABLE II: NON-HAZARDOUS MATERIALS

Actin	Acetylsalicylic acid	Adenosine
Alanine	Albumin	Alconox
Alginic acid	Aminoacetic acid	Aluminum sulfate
Amino acid	Ammonium bicarbonate	Ammonium bitrate
Ammonium carbonate	Ammonium chloride	Ammonium sulfate
Ammonium phosphate	Amylopectin	Arabinose
Arginine	Asparagine	Aspartic acid
Ascorbic acid	Beef extract	Bees wax
Bentonite	Benzoic acid	Bitumen
Boric acid	Broth nutrients	Calcium acetate
Calcium carbonate	Calcium chloride	Calcium fluoride
Calcium gluconate	Calcium phosphate	Calcium sulfate
Carnitine	Casein	Chlorophyll
Choline	Choline chloride	Corticotropin
Creatinine	Cysteine	Cytosine
Dextran	Dextrose	Diathymosulfone
Drierite	EDTA	Epsom salts
Ferric chloride	Ferric sulfate	Ferritin
Ferrous ammonium sulfate	Fructose	Fullers earth
Galactose	Gelatin	Glutamic acid
Glutamine	Glutaric acid	Glutathione

TABLE II: NON-HAZARDOUS MATERIALS

Glycerin	Glycylglycine	Guanosine
Gypsum	Hemoglobin	Histidine
Hydroxyproline	Insulin	Iron oxide
Isoleucine	Kaolin	Keratin
Lactic acid	Lactose	Lanolin
Lecithin	Leucine	Lithium carbonate
Lithium chloride	Lithium sulfate	Litmus
Magnesium carbonate	Magnesium phosphate	Magnesium sulfate
Malt Extract	Maltose	Manganese acetate
Manganese chloride	Manganese sulfate	Mannitol
Methionine	Molecular sieves	Naphthoflavone
Oleic acid	Ovalbumin	Pancreatin
Papain	Paraffin	Pepsin
Peptone	Phenylalanine	Phthalic acid
Plastics	Polymers (solid)	Potassium acetate
Potassium acid phosphate	Potassium bicarbonate	Potassium bisulfate
Potassium borate	Potassium bromide	Potassium carbonate
Potassium chloride	Potassium citrate	Potassium hydrogen phthalate
Potassium iodide	Potassium phosphate	Potassium pyrosulfate
Potassium sulfate	Potassium sulfite	Potassium tartrate
Pumice	Riboflavin	Riboflavin-5-phosphate
Serine	Silicon carbide	Silicon dioxide
Sodium acetate	Sodium ammonium phosphate	Sodium benzoate
Sodium bicarbonate	Sodium bisulfate	Sodium bisulfite
Sodium borate	Sodium carbonate	Sodium chloride
Sodium citrate	Sodium dodecyl sulfate	Sodium fluoride
Sodium formate	Sodium iodide	Sodium lactate
Sodium phosphate	Sodium salicylate	Sodium sulfate
Sodium sulfite	Sorbitol	Sorbose
Succinic acid	Sucrose	Sugars
Tartaric acid	Thiamine hydrochloride	Tocopherol
Trypsin	Tryptophan	Tyrosine
Urea	Uricase	Valine
Xanthine	Yeast extract	

NON-HAZARDOUS WASTE SOLUBILITY

The following table contains anion and cation combinations, which are safe for disposal via the sanitary sewer (if soluble) or via the trash (if insoluble) subject to the conditions stated. Materials that create acid or basic aqueous solutions will require neutralization to a pH of 5-9 prior to disposal to sanitary sewer. Reactive items should not be trashed.

TABLE III: NON-HAZARDOUS WASTE SOLUBILITY

	Acid[5, 6] (H^+)	Aluminum (Al^{3+})	Ammonium (NH^{4+})	Calcium (Ca^{2+})	Ferric[7] (Fe^{3+})	Ferrous[8] (Fe^{2+})	Lithium (Li^+)	Magnesium (Mg^{2+})	Manganous[9] (Mn^{2+})	Potassium (K^+)	Sodium (Na^+)
Acetate	C	SS	S	S	S	VS	VS	VS	S	VS	VS
Benzoate	S	SS	S	S	I	S	SS	S	S	S	VS
Borate[1] ($B_4O_7^{2-}$)	S	I	S	SS			S	SS	I	S	S
Bromide (Br^-)	C	R	VS	VS	S	VS	VS	VS	VS	VS	VS
Carbonate (CO_3^{2-})	S	I	VS	I	I	SS	S	I	I	VS	S
Chloride (Cl^-)	C	R	S	VS	VS	VS	VS	S	VS	S	S
Citrate	S	S	VS	S	S	SS	VS	SS	SS	VS	VS
Formate	C	S	VS	S	S	S	S	S	S	VS	VS
Gluconate	VS		S	SS		S		S		VS	S
Hydroxide[2] (OH^-)	VS	I	C	SS	I	I	C	I	I	C	C
Iodide (I^-)	C	R	VS	VS	S	S	VS	VS	VS	VS	VS
Lactate	S	S	VS	S	S	S	S	S	SS	S	VS
Phosphate[3] (PO_4^{3-})	C	I	S	I	I	I	I	I	SS	VS	VS
Salicylate	S	I	VS	S			VS	S		VS	VS
Silicate	I	I	S	I	I	I	I	I	I	S	S
Sulfate[4] (SO_4^{2-})	C	S	VS	I	S	S	S	VS	VS	S	S
Sulfite[4] (SO_3^{2-})	C		S	I		SS	S	SS		VS	S
Tartrate[4]	S	SS	S	SS	S	SS	S	SS	SS	VS	S

TABLE III Key

C = Caution! These acids and bases can generate a lot of heat or be violent when neutralized or diluted. This is especially true for concentrated solutions.

I = Insoluble, these may be marked as non-hazardous and placed in trash. [Approximate Solubility < 0.01g per 100g Water]

R = Caution! These anhydrous aluminum salts react violently with water. Reactive items should not be trashed.

S = Soluble (also miscible for liquids) [Approximate Solubility 1.0 to 60g per 100g Water]

SS = Slightly Soluble [Approximate Solubility 0.01 to 1.0g per 100g Water]

VS = Very Soluble [Approximate Solubility > 60g per 100g Water]

1 = Also known as tetrabonate. Boric acid, H_3BO_3, Magnesium Borate, $Mg(BO_2)_2$.

2 = All bases must be neutralized before sink disposal.

3 = Includes monobasic, dibasic, and tribasic phosphates. Solubility generally decreases with increasing basicity.

4 = Also known as hydrogen carbonate, hydrogen sulfate, hydrogen sulfite, and hydrogen tartrate.

5 = All acids must be neutralized before sink disposal.

6 = Except for Hydrobromic, Hydrochloric, Hydriodic, Phosphoric, Sulfuric, Sulfurous acids and water, acid names in the table are derived by dropping "ate" from the end of the anion name and adding "ic acid."

7 = Ferric, also known as Iron (III).

8 = Ferrous, also known as Iron (II).

9 = Manganous, also known as Manganese (II).

CHEMICAL TREATMENTS

Procedures for safe treatment and/or neutralizations of the following chemical materials are available from the Hazardous Material Management section of REM. To request a specific chemical's treatment procedure, please call 40121.

TABLE IV: CHEMICAL TREATMENT LISTING

Acetic anhydride	Acetic acid, Glacial
Acetyl chloride	Acetyl bromide
Acid halides and anhydrides	Aflatoxins
Aluminum bromide	Aluminum chloride anhydrous
Ammonia (solution)	Benzoyl peroxide
Benzyl bromide	Benzyl chloride
Bromine	Carbon disulfide
Chlorosilanes (i.e. Chlorotrimethylsilane)	Hydrogen peroxide
Inorganic Acids (i.e. Hydrochloric acid)	Inorganic Bases (i.e. Potassium hydroxide)
Iodine	Lithium tert-butoxide
Magnesium Chloride	Maleic Anhydride
Nitrates (i.e. Sodium nitrate)	Nitric acid
Performic acid	Phosphoric acid
Phosphorus	Phosphorus Oxychloride
Phosphorus Pentoxide	Potassium hydroxide
Potassium methoxide	Potassium nitrate
Potassium nitrite	Potassium tert-butoxide
Sodium ethoxide	Sodium ethylate
Sodium hydroxide	Sodium hypochlorite solution
Sodium methoxide	Sodium tert-butoxide
Sulfamic acid	Sulfuric acid
Tetramethylsilane	Thionyl chloride
Trichlorosilane	

EPA CHARACTERISTIC WASTES CODES

The compounds listed by the USEPA as D004 through D043 and F001 through F005 **must be included in the *Hazardous Material Pickup Request*** form even in trace amounts.

TABLE V: TOXICITY CHARACTERISTIC WASTE CODES (D004 - D043)

EPA Waste Code	Chemical Name	EPA Waste Code	Chemical Name
D004	Arsenic	D024	m-Cresol
D005	Barium	D025	p-Cresol
D006	Cadmium	D026	Cresol
D007	Chromium	D027	1,4-Dichlorobenzene
D008	Lead	D028	1,2-Dichloroethane
D009	Mercury	D029	1,1-Dichloroethylene
D010	Selenium	D030	2,4-Dinitrotoluene
D011	Silver	D031	Heptachlor (and its epoxide)
D012	Endrin	D032	Hexachlorobenzene
D013	Lindane	D033	Hexachlorobutadiene
D014	Methoxychlor	D034	Hexachloroethane
D015	Toxaphene	D035	Methyl ethyl ketone
D016	2,4-D	D036	Nitrobenzene
D017	2,4,5-TP (Silvex)	D037	Pentachlorophenol
D018	Benzene	D038	Pyridine
D019	Carbon tetrachloride	D039	Tetrachloroethylene
D020	Chlordane	D040	Trichloroethylene
D021	Chlorobenzene	D041	2,4,5-Trichlorophenol
D022	Chloroform	D042	2,4,6-Trichlorophenol
D023	o-Cresol	D043	Vinyl Chloride

TABLE VI: HAZARDOUS WASTE CODES FOR NON-SPECIFIC SOURCES (F001 - F005)

F001 (Spent individual solvents used in degreasing.)	1,1,1-trichloroethane, carbon tetrachloride,chlorinated fluorocarbons, methylene chloride, trichloroethylene
F002 (Spent individual solvents.)	1,1,1-trichloroethane, 1,1,2-trichloro-1,1,2-trifluoroethane, 1,1,2-trichloroethane, chlorobenzene, methylene chloride, o-dichlorobenzene, tetrachloroethylene, trichlorofluoromethane
F003 (Spent individual solvents.)	Acetone, cyclohexanone, ethyl acetate, ethyl ether, methanol, methyl isobutyl ketone, n-butyl alcohol, xylene
F004 (Spent individual solvents.)	Cresols, cresylic acid, nitrobenzene
F005 (Spent individual solvents.)	2-ethoxyethanol, 2-nitropropene, benzene, carbon disulfide, isobutyl alcohol, methyl ethyl ketone, pyridine, toluene

The following F codes listed in 40 CFR 261.31, *Hazardous Waste from Non-Specific Sources,* are also counted as acute hazardous waste unless excluded (see 40 CFR 260.20 and 40 CFR 260.22)

F020 Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production or manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tri- or tetrachlorophenol, or of intermediates used to produce their pesticide derivatives. (This listing does not include wastes from the production of Hexachlorophene from highly purified 2,4,5- trichlorophenol.).
F021 Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production or manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of pentachlorophenol, or of intermediates used to produce its derivatives.
F022 Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tetra-, penta-, or hexachlorobenzenes under alkaline conditions.
F023 Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production of materials on equipment previously used for the production or manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tri- and tetrachlorophenols. (This listing does not include wastes from equipment used only for the production or use of Hexachlorophene from highly purified 2,4,5- trichlorophenol.).
F026 Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production of materials on equipment previously used for the manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tetra-, penta-, or hexachlorobenzene under alkaline conditions.
F027 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 sythesized from prepurified 2,4,5- trichlorophenol as the sole component.

The following P and U codes listed in 40 CFR 261.33, *Discarded commercial chemical products, off-specification species, container residues, and spill residues thereof,* are also counted as hazardous waste if and when they are discarded or intended to be discarded as described in 40 CFR 261.2(a)(2)(i).

TABLE VII: P - CODED MATERIALS

EPA Code	CAS#	Chemical Name
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
P007	2763-96-4	5-(Aminomethyl)-3-isoxazolol
P008	504-24-5	4-Aminopyridine
P009	131-74-8	Ammonium picrate
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]-
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-(3aS-cis)-1,2,3,3a,8,8a-hexahydro-1,3a,8-trimethylpyrrolo[2,3-b]indol-5-yl methylcarbamateester
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 $Ca(CN)_2$

TABLE VII: P - CODED MATERIALS

EPA Code	CAS#	Chemical Name
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-[(dimethylamino)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-pyrazinylphosphorothioate
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-(1α,4α,4β,5α,8α,8β)-
P060	465-73-6	1,4,5,8-Dimethanonaphthalene,1,2,3,4,10,10-hexa- chloro-1,4,4a,5,8,8a-hexahydro-,(1α,4α,4β,5β,8β,8β)-
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-, (1aα,2β,2aα,3β,6β,6aα,7β, 7aα)-
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-, (1aα,2β,2β,3α,6α,6aβ,7β, 7aα)-, & 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

TABLE VII: P - CODED MATERIALS

EPA Code	CAS#	Chemical Name
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
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)-Isoxazolone, 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
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-
P118	75-70-7	Methanethiol, trichloro-
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]phenyl]-
P050	115-29-7	6,9-Methano-2,4,3-benzodioxathiepin,6,7,8,9,10,10-hexachloro- 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	315-8-4	Mexacarbate.
P072	86-88-4	alpha-Naphthylthiourea
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 cynaide $Ni(CN)_2$
P075	[1]54-11-5	Nicotine, & salts
P076	10102-43-9	Nitric oxide
P077	100-01-6	p-Nitroaniline

TABLE VII: P - CODED MATERIALS

EPA Code	CAS#	Chemical Name
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
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
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)-, methylcarbamate.
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-nitrophenylester
P039	298-04-4	Phosphorodithioic acid, ,O-diethylS-[2-(ethylthio)ethyl] ester
P094	298-02-2	Phosphorodithioic acid, ,O-diethylS-[(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 acid, O,O-diethyl O-(4-nitrophenyl) ester
P040	297-97-2	Phosphorothioic acid, O,O-diethyl O-pyrazinyl ester
P097	52-85-7	Phosphorothioic acid,O-[4-[(dimethylamino)sulfonyl]phenyl] O,O-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
P017	598-31-2	2-Propanone, 1-bromo-
P102	107-19-7	Propargyl alcohol
P003	107-02-8	2-Propenal

TABLE VII: P - CODED MATERIALS

EPA Code	CAS#	Chemical Name
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
P062	757-58-4	Tetraphosphoric acid, hexaethyl ester
P113	1314-32-5	Thallic oxide
P113	1314-32-5	Thallium oxide $Tl_2 O_3$
P114	12039-52-0	Thallium(I) selenite
P115	7446-18-6	Thallium(I) sulfate
P109	3689-24-5	Thiodiphosphoric acid, tetraethylester
P045	39196-18-4	Thiofanox
P049	541-53-7	Thioimidodicarbonic diamide $[(H_2N)C(S)]_2NH$
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	Trichloromethanethiol
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	[1]81-81-2	Warfarin, & salts, 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%
P205	137-30-4	Ziram

[1]CAS Number given for parent compound only.

TABLE VIII: U - CODED MATERIALS

Hazardous Waste No.	Chemical Abstracts No.	Substance	Hazardous Waste No.	Chemical Abstracts No	Substance
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-
U112	141-78-6	Acetic acid, ethyl ester (I)	U144	301-04-2	Acetic acid, lead salt
U214	563-68-8	Acetic acid, thallium (1 +) salt	U232	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)
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-	U157	50-49-5	Benz[j]aceanthrylene, 1,2-dihydro-3-methyl-
U016	225-51-4	3,4-Benzacridine	U017	98-87-3	Benzal chloride
U192	23950-58-5	Benzamide, 3,5-dichloro-N-(1,1 diethyl-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
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	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(2chloroethyl)amino]-
U037	108-90-7	Benzene, chloro-	U221	25376-45-8	Benzenediamine, ar-methyl
U028	117-81-7	1,2-Benzenedicarboxylic acid, [bis(2-ethyl-hexyl)] 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, di-n-octyl 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-dichloro-ethylidene) 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- (I,T)
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)[4 -methoxy-	U023	98-07-7	Benzene, (trichloromethyl)- (C,R,T)
U234	99-35-4	Benzene, 1,3,5-trinitro- (R,T)	U021	92-87-5	Benzidine
U202	[1]81-07-2	1,2-Benzisothiazol-3-(2H)-one,1,1	U203	94-59-7	1,3-Benzodioxole, 5-(2-propenyl)-

TABLE VIII: U - CODED MATERIALS

Hazardous Waste No.	Chemical Abstracts No.	Substance	Hazardous Waste No.	Chemical Abstracts No	Substance
		dioxide and salts			
U141	120-58-1	1,3-Benzodioxole, 5-(1-propenyl)-	U090	94-58-6	1,3-Benzodioxole, 5-propyl-
U064	189-55-9	Benzo[rst] pentaphene	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 (I,T)	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-	U027	39638-32-9	Bis(2-chloroisopropyl) ether
U024	111-91-1	Bis(2-chloromethoxy) ethane	U028	117-81-7	Bis(2-ethylhexyl) phthalate
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-1- pyrrolizin-1- yl ester, [1S-[1alpha(Z),7(2S,3R),7aalpha]]-
U031	71-36-3	n-Butyl alchohol (I)	U136	75-60-5	Cacodylic acid
U032	13765-19-0	Calcium chromate	U238	51-79-6	Carbamic acid, ethyl ester
U178	615-53-2	Carbamic acid, methylnitroso, ethyl ester	U097	79-44-7	Carbamic chloride, dimethyl-
U114	[1]111-54-6	Carbamodithioic acid, 1,2-ethanediylbis-, salts and esters	U062	2303-16-4	Carbamothioic acid, bis(1-methylethyl)- S-(2,3-dichloro-2-propenyl) ester
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	30503-3	Chlorambucil	U036	12789-03-6	Chlordane
U026	494-03-1	Chlornaphazine	U037	108-90-7	Chlorobenzene
U039	59-50-7	p-Chloro-m-cresol	U041	106-89-8	1-Chloro-2,3 epoxypropane
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, calcium salt	U050	218-01-9	Chrysene
U051	8021-39-4	Creosote	U052	1319-77-3	Cresols (Cresylic acid)
U053	4170-30-3	Crotonaldehyde	U055	98-82-8	Cumene (I)
U246	506-68-3	Cyanogen bromide	U197	106-51-4	2,5-Cyclohexadiene-1,4-dione
U056	110-82-7	Cyclohexane (I)	U057	108-94-1	Cyclohexanone (I)
U130	77-47-4	1,3-Cyclopentadiene, 1,2,3,4,5,5-hexa-chloro-	U058	50-18-0	Cyclophosphamide
U240	[1]94-75-7	2,4-D, salts and esters	U059 2	0830-81-3	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[s,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	111-44-1	Dichloroethyl ether

TABLE VIII: U - CODED MATERIALS

Hazardous Waste No.	Chemical Abstracts No.	Substance	Hazardous Waste No.	Chemical Abstracts No	Substance
U081	120-83-2	2,4-Dichlorophenol	U082	87-65-0	2,6-Dichlorophenol
U240	[1]94-75-7	2,4-Dichlorophenoxyacetic acid, salts and esters	U083	78-87-5	1,2-Dichloropropane
U084	542-75-6	1,3-Dichloropropene	U085	1464-53-5	1,2:3,4-Diepoxybutane (I,T)
U108	123-91-1	1,4-Diethyleneoxide	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	Diethylstilbestrol	U090	94-58-6	Dihydrosafrole
U091	119-90-4	3,3'-Dimethoxybenzidine	U092	124-40-3	Dimethylamine (I)
U093	60-11-7	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 (I)
U111	621-64-7	Di-n-propylnitrosamine	U001	75-07-0	Ethanal (I)
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-diichloro-
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- (1)
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	U227	110-80-5	Ethanol, 2-ethoxy
U359	79-00-5	Ethane, 1,1,2-trichloro-	U173	1116-54-7	Ethanol, 2,2'-(nitrosoimino)bis-
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-	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
U038	510-15-6	Ethyl 4,4'-dichlorobenzilate	U114	[1]111-54-6	Ethylenebis(dithiocarbamic acid), salts and 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	Ethylene thiourea	U117	60-29-7	Ethyl ether (I)
U076	75-34-3	Ethylidene dichloride	U118	97-63-2	Ethyl methacrylate
U119	62-50-0	Ethylmethanesulfonate	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	D-Glucopyranose, 2-deoxy-2(3-methyl-3-nitrosoureido)-	U126	765-34-4	Glycidylaldehyde
U163	70-25-7	Guanidine, N-methyl-N'-nitro-N-nitroso-	U127	18-74-1	Hexachlorobenzene
U128	87-68-3	Hexachlorobutadiene	U129	58-88-9	Hexachlorocyclohexane (gamma isomer)
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-dimethyl- -

TABLE VIII: U - CODED MATERIALS

Hazardous Waste No.	Chemical Abstracts No.	Substance	Hazardous Waste No.	Chemical Abstracts No	Substance
U098	57-14-7	Hydrazine, 1,1-dimethyl-	U099	540-73-8	Hydrazine, 1,2-diethyl
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
U096	80-15-9	Hydroperoxide, 1-methyl-1-phenylethyl- (R)	U136	75-60-5	Hydroxydimethylarsine oxide
U116	96-45-7	2-Imidazolidinethione	U137	193-39-5	Indeno[1,2,3-cd]pyrene
U139	9004-66-4	Iron dextran	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	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-	U123	64-18-6	Methanoic acid (C,T)
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- decachloro-octahydro-	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	Methylchlorocarbonate (I,T)	U226	71-55-6	Methylchloroform
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)	U163	70-25-7	N-Methyl-N'-nitro-N-nitrosoguanidine
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, (8S-cis)-8-acetyl-10-[(3-amino- 2,3,6- trideoxy alpha-L-lyxo- hexopyranosyl)oxy]-7,8,9,10- tetrahydro- 6,8,11-trihydroxy-1-methoxy-
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
U166	130-15-4	1,4-Naphthoquinone	U167	134-32-7	alpha-Naphthylamine
U168	91-59-8	beta-Naphthylamine	U026	494-03-1	2-Naphthylamine, N,N' -bis(2-chloroethyl)-
U167	134-32-7	1 -Naphthylenamine	U168	91-59-8	2-Naphthylenamine
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

TABLE VIII: U - CODED MATERIALS

Hazardous Waste No.	Chemical Abstracts No.	Substance	Hazardous Waste No.	Chemical Abstracts No	Substance
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)
U242	87-86-5	Pentachlorophenol	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-
U170	100-02-7	Phenol, 4-nitro-	U242	87-86-5	Phenol, pentachloro-
U212	58-90-2	Phenol, 2,3,4,6-tetrachloro-	U230	95-94-4	Phenol, 2,4,5-trichloro-
U231	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 salt	U087	3288-58-2	Phosphorodithioic acid, O,O-diethyl-, S-methyl ester
U189	108-95-2	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-	U149	109-77-3	Propanedinitrile
U171	79-46-9	Propane, 2-nitro-(I,T)	U027	39638-32-9	Propane, 2,2' -oxybis[2-chloro-
U193	1120-71-4	1,3-Propane sultone	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)
U084	542-75-6	1-Propane, 1,3-dichloro-	U152	126-98-7	2-Propanenitrile, 2-methyl- (I,T)
U007	79-06-1	2-Propenamide	U243	1888-71-7	1-Propene, hexachloro-
U009	107-13-1	2-Propenenitrile	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	80-66-2	2-Propenoic acid, 2-methyl-, methyl ester(I,T)	U233	93-72-1	Propionic acid, 2-(2,4,5-trichlorophenoxy)-
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]-
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 and salts	U203	94-59-7	Safrole
U204	7783-00-8	Selenious acid	U204	7783-00-8	Selenium dioxide
U205	7446-34-6	Selenium sulfide (R,T)	U015	115-02-6	L-Serine, diazoacetate (ester)
U233	93-72-1	Silvex	U206	18883-66-4	Streptozotocin
U103	77-78-1	Sulfuric acid, dimethyl ester	U189	1314-80-3	Sulfur phosphide (R)
U232	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	U212	58-90-2	2,3,4,6-Tetrachlorophenol

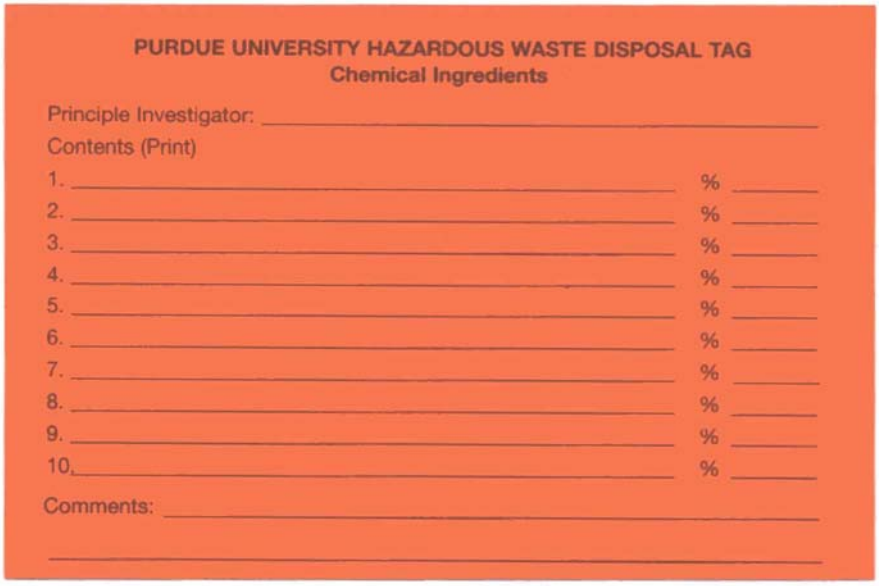
TABLE VIII: U - CODED MATERIALS

Hazardous Waste No.	Chemical Abstracts No.	Substance	Hazardous Waste No.	Chemical Abstracts No	Substance
U213	109-99-9	Tetrahydrofuran (I)	U214	15843-14-8	Thallium(I) acetate
U215	6533-73-9	Thallium(I) carbonate	U216	7791-12-0	Thallium chloride
U217	10102-45-1	Thallium(I) nitrate	U218	62-55-5	Thioacetamide
U153	74-93-1	Thiomethanol (I,T)	U244	137-26-8	Thioperoxydicarbonic diamide, tetramethyl-
U219	62-56-6	Thiourea	U244	137-26-8	Thiuram
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 hydrochlorlde
U011	61-82-5	1H-1,2,4- Triazol-3-amine	U226	71-55-6	1,1,1 -Trichloroethane
U227	79-00-5	1,1,2-Trichtoroethane	U228	79-01-6	Trichloroethylene
U121	75-69-4	Trichloromonofluoromethane	U230	95-95-4	2,4,5-Trichlorophenol
U231	88-06-2	2,4,6-Trichlorophenol	U234	99-35-4	sym-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, 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-trimethoxybenzoyt) oxy]-, methyl ester
U249	1314-84-7	Zinc phosphide, when present at concentrations of 10% or less			

[1]CAS Number given for parent compound only.

LABELS & FORMS

FIGURE 1: HAZARDOUS WASTE DISPOSAL LABEL



PURDUE UNIVERSITY HAZARDOUS WASTE DISPOSAL TAG
Chemical Ingredients

Principle Investigator: _____

Contents (Print)

1. _____ % _____
2. _____ % _____
3. _____ % _____
4. _____ % _____
5. _____ % _____
6. _____ % _____
7. _____ % _____
8. _____ % _____
9. _____ % _____
10. _____ % _____

Comments: _____

_____

FIGURE 2: SAFE FOR DISPOSAL LABEL

FIGURE 3: HAZARDOUS WASTE LABEL

FIGURE 4:

HMM-001

Hazardous Material Pickup Request

(Located on our website: http://www.purdue.edu/rem/home/forms/chemwaste.pdf)

Send to REM, LMSB via campus mail or Fax 49-61106

When filling out this form remember the following:

1. All mixture materials must be submitted in a percentage format. Each Container's percentage must add up to 100%. **See the example below.**
2. Chemical descriptions on this form must match the label on the container.
   - Always include as much information as possible.
   - Only submit known mixtures or chemicals.
   - Absolutely no chemical formulae, abbreviations, acronyms or structures.
3. When submitting trade products:
   - It is your responsibility to provide the product information.
   - An accurate chemical description of the product must accompany the form (i.e. an MSDS).
4. Make sure all writing is legible.
5. Forms completed improperly can cause severe delays in pickup times. * = Waste Location

Principal Investigator:

PI Telephone Number:

Requested By:

Telephone Number: **E-Mail:**

Building: **Room/Shop*:**

Department Name: **Dept. Code:**

Date:

Example Pickup Line:

1	Acetone 50%, Benzene 10%, Dichloromethane 20%, Acetic Acid 10%, Water 10%, Trace Silver	5	5 gal.	5 gal.	S	L

I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Item #	Chemical Description (List Each Container)	Number of Containers	Container Size	Amount of Waste in Container	Spent/ Usable	Solid/ Liquid/ Gas/ Aerosol

Special Comments or Instructions:

HMM001(template).doc

FIGURE 5:

PRINCIPAL INVESTIGATOR LETTER OF CERTIFICATION

Date: _____ 1st Recent Letter: _____

Principal Investigator Name: _____

Building: _____ Department Code: _____

Our records indicate that you are a Principal Investigator (PI) for the above listed location. The Purdue University Chemical Management Committee (CMC) and Title 40 of the Code of Federal Regulations part 262 require each PI responsible for hazardous waste generation to certify their waste minimization efforts. Waste minimization is not only a responsible environmental health practice, but is also a wise economic practice.

Please take a moment to sign, date, and return this waste minimization certification statement. Your certification will allow the REM department to remove and properly dispose of the waste you generate. Thank you for your time.

Annual Waste Minimization Certification

I have made a good faith effort to minimize my hazardous waste generation and select the best waste management method that is available to me.

Print Name: _____ Phone: _____

Signature: _____ Date: _____

Please return via campus mail To: REM, LMSB. If you have any questions, please contact us at 40121.

REFERENCES

1. RCRA it is used interchangeably to refer the laws, regulations, EPA policies, and guidelines. This law is an Act that describes the kind of waste management program that Congress wants to establish. The Act also provides the EPA Administrator with the authority to implement the program.
2. The Code of Federal Regulations (CFR) is a codification of the general and permanent rules published in the Federal Register by the Executive departments and agencies of the Federal Government. The Code is divided into 50 titles, which represent broad areas subject to Federal regulations.
3. The codified RCRA regulations can be found in Title 40 of CFR, Parts 240-282. To cite the regulation use title, part and section number. Thus, 40 CFR 260.1 refers to title 40, part 260, and section 1.
4. Aqueous wastes with a pH greater than or equal to 12.5 or less than or equal to 2 are corrosive.
5. Purdue Chemical Hygiene Plan and Hazardous Materials Safety Manual. Rev. ed. 1995
6. Hazard Communication at Purdue University-Written Compliance Manual