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1. Introduction

The goal of the UAHUNTSVILLE Hazardous Waste Management Plan (HWMP) is to protect the health and safety of employees, students, and the environment while complying with applicable state and federal regulations. Utilizing procedures established within the HWMP the quantity and cost of hazardous waste disposals can be effectively reduced, the environment will be protected and employee safety will be enhanced. Planned purchases of only necessary quantities of chemicals and closeouts of laboratories will greatly reduce the hazardous waste output at UAHUNTSVILLE.

The United States Environmental Protection Agency has implemented strict rules and regulations pertaining to the handling and disposal of hazardous wastes. The Resource Conservation and Recovery Act (RCRA, Appendix A) established the cradle-to-grave concept. This concept involves the tracking a chemical from the time it is considered a waste, determining if it is a hazardous waste by RCRA and managing it accordingly through its transportation, storage, treatment, and disposal or final disposition.

If found to be in violation of RCRA laws UAHUNTSVILLE could be fined up to $37,500 per day per violation. Additionally, criminal charges may be brought against individuals who knowingly violate state, federal, or local regulations. Failure to follow guidelines established within the UAHUNTSVILLE Hazardous Waste Management Plan could result in disciplinary action not to exclude termination of employment

The HWMP shall serve as a guidance document for UAHUNTSVILLE employees to meet the requirements for providing a safe, environmentally sound, and unified response for hazardous waste management. The HWMP is available to everyone through the OEHS website. Note that certain laboratory procedures are not allowed, including pouring chemicals down the drain, “sewering”, and evaporation of solvents in the fume hood. These disposal practices are unacceptable and illegal. The University administration has therefore made a policy decision to prohibit such practices.

UAHUNTSVILLE can neither dispose of nor treat hazardous waste on-site. Only an EPA permitted disposal facility can legally landfill, incinerate, or recycle hazardous waste under the "cradle to grave" system. A waste generator never loses liability for environmental damage. For this reason, treatment, storage and disposal facilities (TSDF) must be carefully chosen. The OEHS determines the TSDF through the state bid system. Stringent criteria have been established to minimize environmental risk and University liability.

The EPA and the Alabama Department of Environmental Management (ADEM), periodically perform inspections of hazardous waste collection procedures,

documentation, and storage facilities. They jointly enforce the regulations governing hazardous waste storage and disposal at UAHUNTSVILLE.

2. Chemical and Hazardous Waste Disposal

Laboratories generating chemical waste must follow EPA and OSHA guidelines for handling chemicals and hazardous substances. These guidelines are found in the Laboratory Safety Manual. The OEHS is responsible for classifying and labeling chemical wastes as EPA hazardous, moving them to the 180 day accumulation site, and following the regulations set forth by the EPA and ADEM for the accumulation of hazardous wastes at a generator accumulation site. The time is dependent upon the generator status. UAHuntsville currently operates as a small quantity generator of hazardous waste.

3. Training Requirements for Hazardous Waste Employees

OEHS employees involved in the management of hazardous waste must be qualified according to RCRA regulations. Employees responsible for hazardous waste handling are required to complete a 24 hour hazardous waste management training course (RCRA) and an eight hour DOT course for shipping hazardous wastes within six months from the date of hire. Annual refresher training is required for the hazardous waste management course. A refresher is required every third year for the transportation course. These employees must be trained on Hazardous Communications Standard prior to beginning work handling hazardous materials. Hazardous waste employees must also attend a 24 hour Hazardous Waste Operations and Emergency Response (HAZWOPER) within one month of beginning work with hazardous materials and an annual refresher until trained to competency. Training from other organizations is acceptable with sufficient documentation.

4. Hazardous Waste Defined

According to RCRA, the two types of hazardous waste are "**listed**" and "**characteristic**". An outline of listed Hazardous Wastes can be found in the appendices. Hazardous chemicals that are not listed may fall under the definition of a RCRA characteristic hazardous waste. The four RCRA classifications of characteristic hazardous waste are ignitable, corrosive, toxic, and reactive. These are defined below. Chemical wastes that do not exhibit any of the four characteristics and are not listed are not hazardous waste. This does not mean that the chemical does not have dangerous properties. Protective measures are outlined in material safety data sheets and must be taken when handling chemicals. Call the Office of Environmental Health & Safety at 2171 for guidance when unsure of the hazard status or handling procedures for chemicals and wastes.

4.1. Characteristic Hazardous Waste

4.1.1. The **Ignitability** characteristic applies to wastes that are:

- Liquids with a flash point less than 140 F

- Solids capable of spontaneous combustion under normal temperature and pressure
- Oxidizing materials
- Ignitable compressed gases
- Examples include ethanol, sodium nitrate, hydrogen gas, and xylene

4.1.2. The **Corrosivity** characteristic applies to wastes that are:

- Aqueous solutions with a pH less than or equal to 2 or greater than or equal to 12.5
- This does not apply to solid or non-aqueous materials
- Examples include hydrochloric acid, nitric acid, and sodium hydroxide

4.1.3. The **Reactivity** Characteristic applies to waste that are**:**

- Normally unstable and readily undergoes violent change without detonating
- Reacts violently with water
- Forms potentially explosive mixtures with water
- When mixed with water it generates toxic gases, fumes, or vapors in a quantity sufficient to present a danger to human health or the environment
- Sulfide or cyanide bearing waste that 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
- Capable of detonation or explosive reaction if it is subjected to a strong initiating source or if heated under confinement
- Readily capable of detonation or, explosive decomposition, or explosive reaction at standard temperature and pressure
- DOT forbidden explosive

4.1.4. The **Toxic** Characteristic applies to the following:
Toxic chemicals are listed as "D wastes" in RCRA and a listing is also provided in the HWMP. Common toxic metals as listed by EPA are arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver. Common toxic organic compounds are pyridine, benzene, carbon tetrachloride, dichlorobenzene, and methyl ethyl ketone. These chemicals have regulatory limits on the quantities that are considered hazardous waste. The concentration should be noted on any solutions containing toxic chemicals. See Appendix E.

4.2. Listed Hazardous waste

Unused or unopened chemicals will meet the definition of a **listed** hazardous waste if they appear on one of two lists. The **U-list** contains materials that are hazardous due to their toxicity. See Appendix B. The **P-list** (Appendix C) contains materials that are hazardous because they are acutely toxic. ***These lists only apply to unused materials that have one of the listed chemicals as the sole active ingredient.*** The list also applies to spill cleanups of these unused materials.

4.2.1. Acutely Hazardous Waste (P-Listed Waste)

Anyone planning to generate or purchase any quantity of an acutely hazardous waste must contact the OEHS prior to doing so in order to develop an appropriate waste management plan. The regulations regarding acutely hazardous waste are much more stringent than those for other hazardous wastes. Accumulation of acutely hazardous waste is limited to only one quart or 1kg per disposal period. Stock reagents and stock reagent containers of these compounds are strictly regulated as acutely hazardous waste. Rinsate and dilute spill cleanup material contaminated with these compounds are also regulated.

Additionally, certain used or spent solvents can be regulated as a hazardous waste if they appear on the **F-list** (Appendix D).

4.2.2. Organic Solvents

RCRA identifies certain chemicals used as organic solvents under a specific set of regulatory requirements. At UAHUNTSVILLE, all organic solvents shall be collected for disposal as hazardous waste. These are segregated as non-halogenated solvents and halogenated solvents.

5. Waste Minimization

The University is required by Federal and State regulations to develop and implement a Waste Minimization Strategy. Ways to help achieve the goal of reducing the volume of Hazardous Waste generated on campus includes but is not limited to:

1. Practice the concept of *Source Reduction* by ordering the smallest quantity of chemical materials required for your research.
2. Maintain an up-to-date inventory for each lab.
3. Share surplus chemicals with other labs.
4. Purchase mercury-free instruments.
5. Substitute hazardous chemicals with non-hazardous chemicals.
6. Reduce the scale of laboratory experiments to reduce amount of waste generated.

6. Hazardous Waste Management

6.1. Liquid Waste Management: Packaging and Containers

Once it is determined that Hazardous Waste will be generated, a container must be selected prior to waste generation.

- Hazardous Waste must be collected by generators in containers that meet Department of Transportation specifications. The same container or type of container in which a reagent was shipped will meet the specifications for shipment as waste.

- Laboratories purchasing solvents in bulk should package the solvent waste in one or five gallon metal or glass containers with screw cap closures. Laboratories generating solvent waste in bulk may use two-gallon safety cans for the collection of waste in the laboratory.
- Laboratory waste containers will be picked up by OEHS personnel for characterization and preparing for disposal. It is imperative for the safety of the OEHS employee that correct labeling is applied to all chemical waste containers.
- UAHUNTSVILLE laboratories may have their waste containers picked up by calling OEHS at 824-2171.
- Chlorinated organic solvents must be kept separate from non-chlorinated organic solvents.
- Mixtures of organic solvent waste that contain any proportion of chlorinated solvent are considered chlorinated for disposal purposes.
- Low molecular weight ethers, such as diethyl ether, must be collected in a one-quart glass or metal container for incineration.
- Organic chemicals are generally collected in glass containers. Acids and bases should be collected and stored in glass or high-density polyethylene containers.
- Wastes containing hydrogen fluoride should also be stored and transported in DOT approved plastic containers.
- Powerful or toxic oxidizers should be collected in glass containers with Teflon lined caps.
- Waste for disposal should be placed in the smallest compatible container.

6.2. Container management

6.2.1. Waste containers

- For most quantities of compatible liquid waste, use two gallon safety cans
- One gallon containers can also be used for smaller volumes of waste. The department generating waste must provide the waste containers.

Waste containers must be:

- In good condition
- Compatible with the waste being stored
- Kept closed at all times except when filling
- Original containers of unused materials do not need a waste label if the original label is clearly legible
- Waste must always remain in the lab in a designated area labeled as “Satellite Waste Accumulation Area”
- Never store waste in PUBLIC AREAS (such as hallways) or on the floor
- Use secondary containment where containers of unwanted material are collected, including containers attached to in-line equipment.

6.3. Solid Chemicals (Unused or left over chemicals in its original containers)

Packaging ***solid*** chemicals is the responsibility of the lab/generator.

- Use cardboard boxes, five-gallon poly pails or other sturdy containers.
- Line the container with a 7-mil polyethylene bag or three standard trash bags
- All containers must have lids.
- Apply a label on the outside of the container indicating it is solid chemical waste..
- Seal the bag with a bag closure tie.
- When the container is full, seal the bag with tape. If the container is in a cardboard box, secure the box with tape as well.
- It is important not to overload containers. Full boxes should not weigh more than 40 pounds. Do not use overly large boxes. Only fill boxes two-thirds full if they contain broken glass.
- Contact OEHS for removal.

UNDER NO CIRCUMSTANCES ARE STUDENTS ALLOWED TO DUMP CHEMICALS INTO SINKS OR OTHER DRAINS WITHIN THE LABORATORY

7. Peroxide Forming Compounds: Potentially Explosive Chemicals (PECs)

Peroxide-forming chemicals are a class of materials that have the ability to form shock-sensitive explosive peroxide crystals. Under normal storage conditions the materials listed in this group (Appendix F) have the potential to generate and accumulate peroxide crystal. These formations may violently detonate when subjected to thermal or mechanical shock. In addition to injury and property damage from explosions, the cost of disposing outdated PECs is exorbitant. It is important that users of PECs track and dispose of them before they become a problem. Proper inventory management is a good way to achieve this goal.

Proactive management of these types of wastes occurs during ordering and management on site in the laboratory. Each laboratory inventory must identify dangerous chemicals such as picric acid, peroxide formers such as diethyl ether, 2-propanol, etc. For P-list and explosive chemicals an electronic tracking mechanism must be used that will alert you when they are nearing the end of their shelf-life.

7.1. Labeling Requirements for PECs

- All bottles of peroxide-forming chemicals must have the date of delivery and the date of first opening.
- They must be labeled each time they are tested for peroxides with the date and results. Inhibitor must be added if peroxides begin to develop. Peroxide formers must always be disposed of within the manufacturers recommended guidelines. Without this information peroxide forming chemicals are treated as highly reactive.

- Bottles with concentration of peroxide over 100 ppm must be disposed of immediately through OEHS.
- If the concentration of peroxide is under 100 ppm, the bottle may be retained and tested every six months at a minimum.
- Test all peroxide formers prior to distillation, regardless of age.

7.2. Storage Requirements for PECs

- Must be kept away from all ignition sources and direct sunlight.
- Storage of PECs in flammable approved safety cabinet or a special designated area is recommended.
- If the peroxide-forming chemical is flammable and requires refrigeration, then an explosion-proof refrigerator must be used.
- Ethers should be stored in amber bottles or other opaque containers and under a blanket of inert gas, such as nitrogen or argon, or over a reducing agent to inhibit formation of peroxides.
- It is recommended to purchase PECs in smaller containers that can be used completely during the experiments rather than purchasing in bulk
- Do not touch or attempt to open containers of a peroxide-forming liquid if there are whitish crystals around the cap and/or in the bottle. If you have such a bottle, contact EHS immediately.

Di- and tri-nitro compounds are potentially explosive in certain situations. Picric Acid is probably the most common example of a tri-nitro compound generally found on the university campuses. Do not let the picric acid crystals dry out. Do not try to open old picric acid bottles. The friction can cause an explosion. Label the bottle with a date of opening and expiration date upon arrival at the lab. Dispose of all old picric acid bottles through OEHS.

A list of the peroxide forming Chemicals is given in Appendix F along with testing procedures.

8.0 Empty Container – EPA Definition

1. A container or an inner liner removed from a container that has held any hazardous waste, except a waste that is a compressed gas or that is identified as an acute hazardous waste listed in §§ 261.31 or 261.33(e) of this chapter is empty if:

I. All wastes have been removed that can be removed using the practices commonly employed to remove materials from that type of container, e.g. pouring, pumping, and aspirating, *and*

II. No more than 2.5 centimeters (one inch) of residue remain on the bottom of the container or inner liner, *or*

a. No more than 3 percent by weight of the total capacity of the container remains in the container or inner liner if the container is less than or equal to 119 gallons in size; or

b. No more than 0.3 percent by weight of the total capacity of the container remains in the container or inner liner if the container is greater than 119 gallons in size.

2. A container that has held a hazardous waste that is a compressed gas is empty when the pressure in the container approaches atmospheric.

3. A container or an inner liner removed from a container that has held an acute hazardous waste listed in Appendix C is empty if:

I. The container or inner liner has been triple rinsed using a solvent capable of removing the commercial chemical product or manufacturing chemical intermediate;

II. The container or inner liner has been cleaned by another method that has been shown in the scientific literature, or by tests conducted by the generator, to achieve equivalent removal; or

III. In the case of a container, the inner liner that prevented contact of the commercial chemical product or manufacturing chemical intermediate with the container, has been removed.

8.1. Empty Chemical Container Management

- It is the responsibility of the OEHS to approve the disposal of chemical containers. Contact the OEHS prior to disposing any chemical container.
- Empty containers that held acutely toxic hazardous wastes (P-list) are managed as hazardous waste and given to OEHS for disposal. DO NOT TRIPLE RINSE. Keep the containers closed at all times. These are collected and disposed of by the OEHS. Contact wodesk@uah.edu to request OEHS disposal.
- Empty containers of highly odoriferous materials like -thiols or mercaptans must also be given to OEHS for disposal to avoid creating odor issues in the lab or hallways. Empty containers of odoriferous materials should be placed into a bag and stored inside a fume hood until OEHS collects them for disposal. Contact wodesk@uah.edu to request OEHS disposal.
- All other containers - cross out original label with black marker and place your initials legibly on container.
- Remove and discard caps, place container in box designated for glassware disposal. When the box is full, secure the lid and tape it to the box. The Custodial department removes these boxes. Place them in the hallway. If the box is not collected within three days contact wodesk@uah.edu to request a disposal.

9. Clean, Uncontaminated Broken Glassware and Non-hazardous Waste

Glassware and other expendable items contaminated by hazardous chemicals must be rinsed with a suitable solvent. The rinsate must be labeled as chemical waste and disposal protocols as previously described must be followed. The glassware must then be collected in individual laboratories in a receptacle used for glass only. Persons responsible for the laboratory must securely seal these containers prior to removal from

the laboratory. In an effort to minimize the amount of hazardous waste generated on campus, clean, uncontaminated glassware and plastic ware should not be managed as waste. Non-hazardous solid waste includes garbage, rubbish, paper, cardboard, aluminum cans, and glass. These items are collected and disposed of by the Grounds Department of Facilities and Operations.

9.1. Sharps

Dispose of all needles, syringes, and razor blades as infectious waste by placing them inside a sharps container. Never reuse sharps containers. Contact the OEHS for sharps disposal.

9.2. Paints

9.2.1.Latex

Water-based paints that are left over may be converted to a non-hazardous solid waste by adding a suitable filler material (vermiculite, cat litter) to completely solidify all paint – leave paint lid off can and dispose of completely solid and dry paint waste in the dumpster. **Preferred method is recycling through vendor by keeping all the left over paint in a good condition.** Wet latex paint should never be placed in the dumpster/trash.

9.2.2. Oil-Base

Oil-based left over paints must be collected and disposed of as hazardous waste. Store in designated satellite waste accumulation area, with appropriate label or pour into a designated and labeled 55 gal waste drum. Do not mix in any two part or epoxy type paints. Try to substitute oil- based paint with water-based paint whenever possible to reduce the amount of hazardous waste generated. **If there is excess oil-based paint, try to use it up completely by applying an extra coat over the intended area.**

9.3. Mercury Containing Items

Mercury containing items such as thermometers and manometers must be collected for hazardous waste disposal. The mercury in these devices is recycled whenever possible. Broken fluorescent lamps containing mercury are collected in drums and are handled and disposed of as per Universal Waste guidelines.

9.4. Compressed Gas Cylinders

Disposal of compressed gas cylinders can cost hundreds of dollars depending upon the nature of the gas. Purchasing compressed gas in a returnable and/or refillable lecture bottle or cylinder could save money. All compressed bottles must be labeled and "EMPTY" must be placed on the bottle when it is empty.

9.4.1. Gas Cylinder Return

It is the responsibility of the user/department to contact the manufacturer or vendor of the cylinder to confirm the policy on returns. Follow the instructions given by the vendor to ship or return the cylinder. Any gas cylinder that is not returnable will require

management as a hazardous waste. The chemical gas mixture must be clearly identified on the "hazardous waste" label. The approximate pressure (psi) must also be noted on the label. All hazardous waste cylinders must have caps tightly closed over the valves.

10. Unknown Waste

Unknown waste materials must be managed as hazardous waste until testing is performed. Identification of the material falls to the owner of the waste or failing that, the department responsible for the lab generating the waste. Identification can be performed by an analysis within the lab/department to identify the waste, or utilizing the TSDF lab pack chemists to perform this function**. In either case all costs incurred in identification are the responsibility of the lab/department involved**. The amount of unknown waste generated is eliminated by ensuring the hazard communication standard and laboratory close-outs are performed.

If you find “unknown” waste, please follow the below guidelines:

1. Contact OEHS immediately to inform about the existence of the material.
2. Gather as much information as possible about the waste and how it was generated.
3. Contact people who may have information about the material including those who left the university is recommended.
4. Do not move the material from your laboratory or work area. OEHS or the waste contractor will remove the material from your laboratory.
   DO NOT
   - dump unknown chemicals down the drain
   - mix unknown chemicals with any other chemicals for consolidation
   - bring unknown chemicals to a regular waste pickup unless instructed by OEHS to do so

Avoid generating unknown hazardous waste by following these basic rules:

1. Label all chemicals and secondary containers the moment it comes to the lab.
2. Do not use abbreviations.
3. Dispose of unwanted and unusable chemicals promptly.
4. Follow the lab closeout procedure whenever a person leaves the university or changes labs.

11. Universal Waste

Universal waste is a category of widely generated hazardous waste that poses a relatively low risk to human health and/or the environment during accumulation, storage, and transport. While a majority of hazardous waste is generated by laboratories or in industry, universal wastes are generated by nearly every type of business, as well as in private residences. Because of the low risks and widespread use associated with universal waste, the regulations pertaining to universal waste management are much less stringent than those for non-universal hazardous wastes.

11.1. Regulatory Authority

Universal waste is regulated by the Environmental Protection Agency under 40 CFR 273 (Standards for Universal Waste Management) and the Alabama Department of Environmental Management Standards for Universal Waste Management, Chapter 335-14-11.

11.2. Universal Waste Types/Definitions

Hazardous wastes that can be handled as universal waste include batteries, pesticides, mercury containing devices, lamps, cathode ray tubes, and antifreeze.

For more information reference the UAHuntsville Universal Waste Management Plan.

12. Laboratory Close-Out

Occasionally laboratories discontinue operations. This may be due to a change of directors, supervisors, or researchers, or due to a change in research opportunities. When this happens, it is mandatory to contact the OEHS for Laboratory Close Out one month prior to out-processing. One month seems long but it is necessary in case there are unknown chemicals that require identification, hazardous waste that must be removed, contaminated equipment to be decontaminated or chemical materials and laboratory equipment that must be surplused. Failure to appropriately Close Out a laboratory may result in the collection of fees for services provided by the OEHS. The OEHS will not be responsible for any additional costs, regulatory action or fines resulting from non-compliance with this policy. In these instances, the responsible department will be charged for any necessary remediation funds.

During laboratory Close Out it is important to be thorough and investigate all areas and equipment including; autoclaves, refrigerators, incubators, centrifuges, ovens, cabinets, freezers, cold rooms, stock rooms, fume hoods, etc. Mishandling of regulated materials may result in the assessment of fines and or the loss of the right to use these materials. It is therefore of utmost importance that closes out procedures are implemented and strictly adhered to within each department. The following are guidelines for use when faculty and staff members responsible for laboratory facilities are leaving the University or transferring to a new laboratory.

12.1. Guidelines for Laboratory Close Outs

12.1.1. Chemicals

- All containers of chemicals must be securely closed and appropriately labeled. All laboratory glassware containing residues or chemicals must be emptied and disposed of appropriately. Please remember that UAHUNTSVILLE has a “No Drain” policy for chemical wastes. Insure all areas of the lab have been inspected for chemical wastes. Wastes must be segregated, prepared and labeled according to the Hazardous Waste Management Plan. A chemical waste inventory must be

completed and submitted to the OEHS. The form and instructions are provided in Appendix G. Upon receipt of the inventory the OEHS will schedule a pick-up.
- Chemicals that will be transferred to other laboratories must be segregated. The chemicals must be packed according to compatibility and safe-handling techniques must be utilized. Contact the CHO at 824-2171 for more information.
- Empty drawers and cabinets.
- For disposing regular trash, try to confine the materials to one space.
- Clean all benchtops and work surfaces, including the work surface of fume hoods, biosafety cabinets and other ventilated devices. Ensure all surfaces are free from chemical residues.

If individuals in the lab are not able to complete the cleaning, contact OEHS to make arrangements for an environmental services contractor to do the work. The responsible department will be expected to pay the labor charges.

12.1.2. Gas Cylinders

Reusable cylinders should be returned to the supplier or manufacturer as soon as possible upon becoming empty as suppliers charge the University for rental of cylinders. Disposable cylinders should be completely emptied, the valve removed and the cylinder recycled. The University's hazardous waste disposal contractor will, under special circumstances, accept pressurized cylinders for disposal at an expense.

- Cylinders must be disconnected; their valve caps replaced and must be returned to suppliers.
- Non-returnable cylinders must be manifested for submission to the OEHS as chemical waste. When empty, it is imperative to label all non-returnable cylinders as empty.

13. Annual Laboratory Clean Out

UAHUNTSVILLE is an academic entity eligible for the benefits outlined under 40 CFR 262 Subpart K, Alternative Requirements for Hazardous Waste Determination and Accumulation of Unwanted Material for Laboratories Owned by Eligible Academic Entities. Under this provision UAHUNTSVILLE is entitled to generate hazardous waste above the limits set by small quantity generator status during an annual lab clean-out process. OEHS will be overseeing the clean-out procedure. If necessary, OEHS will make arrangements for an environmental services contractor to do the work.

All clean-out procedures must be documented according to 40 CFR 262.213 Subpart K. The documentation must identify the laboratory being cleaned out, must identify the PI/supervisors, start and end date of the clean-out process, and the amount of hazardous material generated. OEHS must keep all the documentation a minimum of three years from the date clean-out ends. The OEHS will maintain paper documentation in PPB 115

A and electronic copies on the Central Files located on the PPB server. OEHS must remove all the unwanted material generated during the clean-out process from the lab within 10 days of the end of the clean-out.

The faculty member assigned to a laboratory is responsible for the proper use and disposal of all chemical materials in his/her assigned laboratory space. All laboratories must perform an annual review of the inventory to inspect the conditions of chemical containers and to dispose of any unwanted, unusable, and or expired chemicals. This is called a Laboratory Clean Out. They are scheduled once per year. (See Appendix K)

13.1. Annual Lab Clean-Out Procedures

- Select all old, unwanted, expired and used chemicals for disposal from the laboratory and storage units such as refrigerators, cold rooms, stock rooms, etc. Label according to the Laboratory Safety Manual.
- Redistribute any usable but unwanted chemicals to departmental personnel.
- Use the UAH Chemical Waste Inventory Form to itemize the wastes for OEHS pick up. Indicate across the top of the inventory form **"Annual Clean-Out"**. The start and end dates of the clean-out must be recorded on the form.
- Place all chemical waste containers for disposal in secondary containers (a larger compatible container to hold spills and keep safe from accidental breakage). Multiple containers can be placed in the secondary container as long as the contents are compatible. Compatibility of the wastes in the container is critical for safety.
- Fill the secondary container with enough packing/absorbent material to ensure all liquids would be absorbed if all of the containers break.
- Attach the chemical waste inventory form that indicates "Annual Clean-Out" to the outside of the secondary container.
- Place the wastes and or secondary container in the designated Satellite Waste Accumulation Area. Contact the wodesk@uah.edu with the information –
  Chemical waste pick-up
  Responsible party name
  Building and room number
  Contact phone number

- Update the remaining laboratory inventory.
- Clean and decontaminate all laboratory equipment, fume hoods, bench tops, cabinets, floors, and shelves.
- To dispose of equipment (not containing hazardous materials), place a surplus request with Business Services.
- The PI/Supervisor must inspect the facility and certify that the employees under his/her supervision followed the appropriate procedures for the clean-out.

14. Accumulating Hazardous Waste

All university hazardous waste is maintained in 180 day accumulation chemical storage buildings. All wastes are sorted by OEHS personnel prior to moving them to the storage units. Upon relocation to the storage unit and within 96 hours of receipt, the OEHS will classify all hazardous wastes. Compatible hazardous wastes can be placed in a secondary storage bin of compatible material with enough absorbent materials to absorb all of the material in the individual containers. The secondary container will be labeled with the EPA hazard identification codes according to RCRA guidelines. By regulation, UAHUNTSVILLE may store hazardous wastes at a single facility-wide storage area. However, each laboratory generating hazardous waste on campus is considered as a Satellite Hazardous Waste Accumulation Area and these areas must be marked with proper signage. The sign must indicate "Satellite Waste Accumulation Area".

14.1. Rules for Accumulation at Satellite Waste Areas:

- Must Be under the control of the person in charge of the waste generating process
- The volume of hazardous waste may not exceed 55 gallons or one quart of acutely hazardous waste (P-listed waste).
- Once either limit is reached, lab must immediately inform OEHS for the removal of the material from your laboratory. The OEHS has 48 hours to respond and move the items to 180 day accumulation.
- The location of the Satellite Accumulation Area must be at or near the point where the waste is generated.
- Waste must not be generated in one room and taken to another room for storage.

14.2. Segregation

All waste stored together must be compatible. Guidelines for segregation of chemicals as found in the Laboratory Safety Manual must be adhered to. Incompatible waste e.g., oxidizers and organic solvents, generated by a single laboratory must be separated by storing these materials in separate cabinets or shelves. Generally the chemical classes should be segregated. This information will be listed on the label of each chemical or on the MSDS. Mixing of wastes that represent different hazard classes must be avoided.

14.3. Inspecting Satellite Waste Accumulation Areas

Generators must inspect their accumulation areas to make sure that collection containers are clean, closed, properly labeled, segregated, and not leaking.

All satellite waste accumulation areas must be inspected on a weekly basis. Below is the guideline for inspection:

- Replace leaking containers
- Clean all spills

- Secondary containment for liquid waste containers must be used and leaks and spills must be cleaned
- Ensure labeling is appropriate and legible, replace or secure if not
- Ensure caps are on all containers and tightly closed
- Ensure the compatibility of the waste and primary and secondary containment
- Contact the OEHS if the total quantity of waste is approaching 50 gallons, or if there is any quantity of acutely hazardous waste as listed in appendix C.

A leaking container must be either packed in a secondary container, or its contents transferred to another container. The secondary container must have enough absorbent material to fully absorb the contents of the container. This waste must be packaged and classified by the OEHS. In addition, generators must post a copy of the UAHUNTSVILLE Hazardous Waste Management Plan and inform all laboratory personnel of its location. The OEHS will conduct periodic inspections of laboratories known to generate chemical waste to ensure compliance with this plan and all the hazardous waste regulations.

Laboratory Workers Are Responsible For:

- Proper labeling of all chemical waste containers
- Marking the date when waste accumulation started
- Proper storage of waste and chemicals
- Preventing spills of waste or chemicals
- Cleaning small spills in their areas
- Weekly inspection of waste containers
- Informing OEHS when chemical waste is ready for removal
- Limiting waste storage within the lab and adhering to storage limits

15. Initiating Waste Removal from the Lab

UAHUNTSVILLE will comply with § 262.208(a) (1) by following a regularly scheduled chemical waste pick up plan not exceeding six months for each laboratory. The OEHS coordinates the removal of Hazardous Waste from the UAHUNTSVILLE campus a minimum of every 180 days, or as needed. In the event the UAHUNTSVILLE generator status increases from a small to a large quantity generator the frequency of disposal will increase to a minimum 90-day interval. A schedule for regular waste pick up is available in Appendix H.

The accumulation of over 55 gallons of waste or one quart of acutely hazardous waste in any facility except the authorized UAHUNTSVILLE 180 day waste storage area is not allowed under RCRA regulations. If a laboratory expects to generate quantities in excess of these limits within a six-month period, arrangements must be made with the OEHS to schedule pickups more frequently. To request a waste pick up, contact the OEHS at 824-2171 or email a completed chemical waste inventory, provided in Appendix G. Trained OEHS personnel are responsible for removing the waste from the laboratory

within 10 days of the date of the request, unless the quantity approaches 50 gallons or there is an acutely hazardous waste. In these circumstances the OEHS must remove the waste within 48 hours.

16. Hazardous Waste Determination

Laboratory personnel should **handle all** wastes (chemical solids, liquids, or containerized gases) **as hazardous** unless it has been confirmed to be non-hazardous waste by OEHS. A laboratory chemical becomes a "chemical waste" when you no longer intend to use it, regardless of whether or not it has been used or contaminated. Also, spilled chemicals and absorbent materials used to clean the spill should be disposed of as chemical waste. OEHS assumes responsibility for transfer of chemical waste from the laboratories to the 180 Day Accumulation Area and for making the final “hazardous waste” determination. Trained OEHS personnel must accompany all chemical waste transported from the laboratories to the central accumulation site. All chemical waste removed from the laboratories must be taken directly to the 180 day accumulation area. Trained OEHS personnel must determine if the chemical waste is a hazardous waste within 4 calendar days of arrival at the 180 day accumulation site. If the chemical waste is a hazardous waste, a hazardous waste sticker must be affixed to the container with the appropriate hazardous waste code(s) within 4 calendar days of arrival at the 180 Day Accumulation site. UAHUNTSVILLE can neither dispose of nor treat hazardous waste on-site. Only an EPA permitted treatment, storage and disposal facility (TSDF) can legally landfill, incinerate, or recycle hazardous waste under the "cradle to grave" system. The OEHS determines the TSDF through the bid system. Stringent criteria have been established to minimize environmental and health risk and risks during transportation as well as future disposal concerns. The chosen qualified vendor will make an on-site determination of the appropriate hazardous waste disposal methodologies before transporting them off-site.

17. Training

Employees are responsible for performing their work in a safe and responsible manner. Knowledge of appropriate work practices and health and safety rules are essential to achieve this goal. Laboratory workers range from students to researchers with many years of experience, a much broader array of knowledge and skill than found in typical industrial settings. “One size fits all” training will fail in this setting. Nonetheless, there is certain information that everyone must know to handle chemical waste properly. The OEHS uses a variety of methods including informal meetings, reference manuals and posted signs as well as formal training sessions and web based materials to build knowledge.

All personnel who work with chemicals must be trained in the proper and safe handling, storage, and disposal of these materials. This requirement applies to visiting and/or part-time researchers as well as contractors. The OEHS has the responsibility for providing

training to faculty and staff. Laboratory Safety Training is offered at the beginning of fall and spring semesters. Safety manuals are accessible on OEHS web site for reference. The training provides an overview of federal, local, and state guidelines and University policy related to laboratory safety along with topics listed below:

- Chemical use/storage and labeling
- Hazard recognition and risk assessment
- Hazard controls including the use of personal protective equipment
- Good housekeeping
- Waste labeling and disposal
- Emergency response

Principal Investigators/Supervisors are responsible for providing the initial and continuing health and safety training necessary for safe handling of hazardous materials and laboratory techniques to anyone working under their supervision (undergraduate or graduate students, researchers, post-docs etc.). Principal Investigators/Supervisors must document the training using Training Record Forms from Appendix I. Employees are observed for safe work habits by both their supervisor and during safety audits. Annual refresher training is also offered to all employees. All training documentation is subject to OEHS review during annual audits.

17.1. Registration

Registration is required for all training classes provided by OEHS. Registration is accomplished through the OEHS web site.

17.2. Cost

Most classes are offered free of cost to all UAHuntsville employees. Classes begin at scheduled times. Since the classes deal with a lot of regulatory information, late entry is not allowed. Any one coming more than 10 minutes late will be asked to reschedule the class. Classes are provided at many locations around the campus. For more information regarding these classes contact OEHS at 256-824-6053.

17.3. Requirements

Each individual must pick the training based on the nature of the work they perform. Everyone must be properly trained before the beginning of the work, beginning of new assignments or whenever a new hazard is introduced into their work.

All laboratory personnel are required to take Laboratory Safety Training and annual refresher training. This requirement is applicable to visiting and part time researchers.

17.4. Recordkeeping

Nearly all records must be kept for the length of employment plus 30 years (basically forever). Chemical and biological agent inventory and hazardous waste disposal records must be kept indefinitely. Training, and test results must be kept for the length of employment plus 30 years. OEHS employee files will be maintained in the OEHS hard files and on the Facilities and Operations Central Files as a computer file. The Central Files are backed up daily.

18. Emergencies

18.1. Emergency Notification and Response

Call the UAHuntsville Police Department (UAHPD) for immediate assistance when chemical/biological exposure, leak, fire and or injury have occurred. The UAHPD can be reached by dialing **6911** on any campus phone. The universal emergency number, **911**, can also be called and the same results achieved for emergency services. Injuries and exposures should be attended immediately and an emergency number called as soon as possible to request an ambulance or other assistance. Each laboratory must keep a copy of the UAHuntsville Emergency Procedures Handbook in an obvious location in the lab and near a phone if equipped. Ensure the Emergency Phone Numbers are completed in the front of each book. Each lab will be provided a sign for the exterior of the door(s) for emergency response purposes. This sign cannot be developed until the OEHS has received the chemical inventory.

Laboratories must also have emergency evacuation routes posted. The Building Coordinator maintains copies of the building evacuation routes/emergency equipment. Information on these posters must be accurate. In an emergency these may be used as the primary source of information.

The evacuation routes must contain the following information:

- Name and contact information of the responsible individuals
- A drawing of the room that shows the location of items such as fume hood, chemical storage area, waste storage area etc
- Review date (annually and as laboratory facilities are modified and or as equipment is moved)

A copy of the evacuation route should be placed on or near every entrance to the room.

UAHUNTSVILLE will utilize the Huntsville Fire Department HazMat Response Unit for emergency response actions involving unknown chemicals and spills requiring fully encapsulating personal protective equipment. The procedures will follow the

UAHuntsville Emergency Action Plan for hazardous material releases. The procedures are found on the UAH Emergency Planning web site.

In the event of a serious emergency such as fire, explosion or release of hazardous gas, the building must be evacuated. At the sound of the alarm everyone must leave the building immediately. Before leaving a lab, time and situation permitting, you should shut down all experiments, close gas mains, turn of all heating devices, electrical appliances and vacuum pumps. When you leave the lab, leave the lights on, shut the doors and leave it unlocked. Follow the laboratory evacuation plan and meet with other lab members at your designated assembly area.

19. RESPONSIBILITY AND ENFORCEMENT

The establishment and enforcement of the Hazardous Waste Management Plan is under the auspices of the OEHS which acts in an advisory capacity to the Associate VP for Facilities and Operations and to the Environmental Health and Safety (EHS) Committee. The OEHS will review policies, hear complaints and make final recommendations to the Associate VP and EHS Committee regarding policies related to hazardous materials on campus.

Audits of chemical waste accumulation areas are conducted annually by the chemical hygiene officer. A multi-part checklist and guidelines for the audit procedure is provided in the Laboratory Safety Manual.

Due to the seriousness of non-compliance and/or complacency with existing federal, state and local regulations, which may result in civil and/or criminal liabilities, the policies and guidelines presented in this document must be followed as a minimum. Failure to comply, blatant disregard, or multiple infractions may result in disciplinary action not excluding termination of employment.

Appendix A – Resource Conservation and Recovery Act Regulations

Appendix B - U Listed Toxic Hazardous Waste

Appendix C – P Listed Acutely Hazardous Waste

Appendix D - F001 – F005 Listed Spent Solvent Hazardous Waste

Appendix E – D Listed Toxic at Specific Concentrations Hazardous Waste

Appendix F – Peroxide Forming Chemicals, Potentially Explosive Chemicals (PECs)

Appendix G – Chemical Waste Inventory Instructions and Form

Appendix H – Regular Chemical Waste Disposal Schedule

Appendix I – Training Record Form

Appendix J – Laboratory Emergency Information Sign

Appendix K – Annual Laboratory Clean Out Schedule

Appendix A – Resource Conservation and Recovery Act Regulations

Appendix B - Hazardous Waste, U-List, toxic

Hazardous Waste No.	Chemical Abstracts 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	93-76-5	Acetic acid, (2,4,5-trichloro phenoxy)-
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-

Hazardous Waste No.	Chemical Abstracts No.	Substance
		methyl-, [1aS-(1alpha, 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-

Hazardous Waste No.	Chemical Abstracts No.	Substance
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-dichloroethyli-dene)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-

Hazardous Waste No.	Chemical Abstracts No.	Substance
		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
U203	94-59-7	1,3-Benzodioxole, 5-(2-propenyl)-
U141	120-58-1	1,3-Benzodioxole, 5-(1-propenyl)-
U090	94-58-6	1,3-Benzodioxole, 5-propyl-
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-,
U367	1563-38-8	7-Benzofuranol, 2,3-dihydro-2,2-dimethyl-
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

Hazardous Waste No.	Chemical Abstracts No.	Substance
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
U238	51-79-6	Carbamic acid, ethyl ester
U178	615-53-2	Carbamic acid, methylnitroso-, ethyl ester
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
U373	122-42-9	Carbamic acid, phenyl-, 1-methylethyl ester
U409	23564-05-8	Carbamic acid, [1,2-phenylene bis(iminocarbonothiol)]bis-, dimethyl ester
U097	79-44-7	Carbamic chloride, dimethyl-
U114	[1]111-54-6	Carbamodithioic acid, 1,2-ethane-diylbis-, salts & esters

Hazardous Waste No.	Chemical Abstracts No.	Substance
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	Chlornaphazine
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 H_2CrO_4, calcium salt
U050	218-01-9	Chrysene

Hazardous Waste No.	Chemical Abstracts No.	Substance
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-hexa-chloro-, (1alpha, 2alpha,3beta,4alpha,5alpha,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 and 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

Hazardous Waste No.	Chemical Abstracts No.	Substance
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-Dimethylbenzylhydro-peroxide (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

Hazardous Waste No.	Chemical Abstracts No.	Substance
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
U041	106-89-8	Epichlorohydrin
U001	75-07-0	Ethanal (I)
U174	55-18-5	Ethanamine, N-ethyl-N-nitroso-
U404	121-44-8	Ethanamine, N,N-diethyl-
U155	91-80-5	1,2,Ethanediamine, N,N-dimethyl-N'-2-pyridinyl-N'-(2-thienyl-methyl)-
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	Ethaninidothioic acid, N,N'-[thiobis[(methylimino) carbonyloxy]]bis-, dimethyl ester
U394	30558-43-1	Ethanimidothioic acid, 2-(dimethylamino)-N-hydroxy-2-oxo-, methyl ester

Hazardous Waste No.	Chemical Abstracts No.	Substance
U359	110-80-5	Ethanol, 2-ethoxy-
U173	1116-54-7	Ethanol, 2,2'-(nitrosoimino)bis-
U004	98-86-2	Ethanone, 1-phenyl-
U395	5952-26-1	Ethanol, 2,2'-oxybis-, dicarbamate
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

Hazardous Waste No.	Chemical Abstracts No.	Substance
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-[[(methyl-nitrosoamino)-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 H2S
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)

Hazardous Waste No.	Chemical Abstracts No.	Substance
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-

Hazardous Waste No.	Chemical Abstracts No.	Substance
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-hexopyranosyl)oxy]-7,8,9,10-tetrahydro-6,8,11-trihydroxy-1-methoxy-, (8S-cis)-
U167	134-32-7	1-Naphthalenamine

Hazardous Waste No.	Chemical Abstracts No.	Substance
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,Naphthaquinone
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

Hazardous Waste No.	Chemical Abstracts No.	Substance
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	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-
U411	114-26-1	Phenol, 2-(1-methylethoxy)-, methylcarbamate
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-
See F027	87-86-5	Phenol, pentachloro-
See F027	58-90-2	Phenol, 2,3,4,6-tetrachloro-
See F027	95-95-4	Phenol, 2,4,5-trichloro-
See F027	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

Hazardous Waste No.	Chemical Abstracts No.	Substance
		ester
U189	1314-80-3	Phosphorous 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	93-72-1	Propanoic acid, 2-(2,4,5-trichloro-phenoxy)-
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

Hazardous Waste No.	Chemical Abstracts No.	Substance
U411	114-26-1	Propoxur
U194	107-10-8	n-Propylamine (I,T)
U083	78-87-5	Propylene dichloride
U387	52888-80-9	Prosulfocarb
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, & 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	79-34-5	L-Serine, diazoacetate (ester)
See F027	115-02-6	Silvex (2,4,5-TP)
U206	93-72-1	Streptozotocin
U103	18883-66-4	Sulfuric acid, dimethyl ester
U189	77-78-1	Sulfur phosphide (R)
See F027	1314-80-3	2,4,5-T
U207	93-76-5	1,2,4,5-Tetrachlorobenzene
U208	95-94-3	1,1,1,2-Tetrachloroethane
U209	630-20-6	1,1,2,2-Tetrachloroethane

Hazardous Waste No.	Chemical Abstracts No.	Substance
U210	127-18-4	Tetrachloroethylene
See F027	58-90-2	2,3,4,6-Tetrachlorophenol
U213	109-99-9	Tetrahydrofuran (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	95-95-4	2,4,5-Trichlorophenol
See F027	88-06-2	2,4,6-Trichlorophenol

Hazardous Waste No.	Chemical Abstracts No.	Substance
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	59-73-9	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-trimethoxy-benzoyl)oxy]-, methyl ester, (3beta,16beta,17alpha,18beta, 20alpha)-
U249	1314-84-7	Zinc phosphide, Zn_3P_2, when present at concentrations of 10% or less

1 CAS Number given for parent compound only.

Appendix C – Hazardous Waste, P-list, acutely hazardous

Hazardous Waste No.	Chemical Abstracts 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)
P008	504-24-5	5-(Aminomethyl)-3-isoxazolol
P007	2763-96-4	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

Hazardous Waste No.	Chemical Abstracts No.	Substance
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-(methyl-amino)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-trimethylpyrrolo [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

Hazardous Waste No.	Chemical Abstracts No.	Substance
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	55282-14-8	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-pyrozol-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

Hazardous Waste No.	Chemical Abstracts No.	Substance
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
P191	644-64-4	Dimetilan
P043	55-91-4	Diisopropylfluorophosphate (DFP)
P004	309-00-2	1,4,5,8-Dimethanonaphthalene, 1,2,3,4,10,10-hexachloro-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-hexachloro-1,4,4a,5,8,8a-hexahydro-, (1alpha,4alpha, 4abeta,5beta,8beta,8abeta)-

Hazardous Waste No.	Chemical Abstracts No.	Substance
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-, (1alpha,2beta, 2alpha,3beta,6beta,6alpha,7beta, 7alpha)-
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-, (1alpha,2beta, 2beta,3alpha,6alpha,6beta,7beta, 7alpha)-, & metabolites
P044	60-51-5	Dimethoate
P046	122-09-8	alpha, alpha-Dimethylphenethylamine
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

Hazardous Waste No.	Chemical Abstracts No.	Substance
P051	72-20-8	Endrin, & metabolites
P042	51-43-4	Epinephrine
P031	460-19-5	Ethanedinitrile
P066	16752-77-5	Ethanimidothioic acid, N-[[(methylamino)carbonyl] oxy]-, methyl ester
P194	23135-22-0	Ethanimidothioc acid, 2-(dimethylamino)-N-[[(methylamino) carbonyl]-2-oxo]-, 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

Hazardous Waste No.	Chemical Abstracts No.	Substance
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 (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]oxl]phenyl]-
P199	2032-65-7	Methiocarb
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-hexachloro-

Hazardous Waste No.	Chemical Abstracts No.	Substance
		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-
P190	1129-41-5	Metolcarb
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
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 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)

Hazardous Waste No.	Chemical Abstracts No.	Substance
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	2315-22-0	Oxamyl
P089	56-38-2	Parathion
P034	131-89-5	Phenol, 2-cyclohexyl-4,6-dinitro-
P128	315-18-4	Phenol, 4-(dimethylamino)-3,5-dimethyl-, methylcarbamate (ester)
P199	2032-65-7	Phenol, (3,5-dimethyl-4-(methylthio)-, methylcarbamate
P048	51-28-5	Phenol, 2,4-dinitro-
P047	[1]534-52-1	Phenol, 2-methyl-4,6-dinitro, & salts
P202	64-00-6	Phenol, 3-(1-methylethyl)-, methyl carbamate
P201	2631-37-0	Phenol, 3-methyl-5-(1-methylethyl)-, methyl carbamate
P020	88-85-7	Phenol, 2-(1-methylpropyl)-4,6-dinitro-
P009	131-74-8	Phenol, 2,4,6-trinitro-, ammonium salt (R)
P092	62-38-4	Phenylmercury acetate
P093	103-85-5	Phenylthiourea

Hazardous Waste No.	Chemical Abstracts No.	Substance
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 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

Hazardous Waste No.	Chemical Abstracts No.	Substance
P098	151-50-8	Potassium cyanide K(CN)
P099	506-61-6	Potassium silver cyanide
P070	116-06-3	Propanal, 2-methyl-2-(methylthio)-, O-[(methylamino) carbonyl]oxime
P201	2631-37-0	Promecarb
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)-, and 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

Hazardous Waste No.	Chemical Abstracts No.	Substance
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, and 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 Tl_2O_3
P114	12039-52-0	Thallium(1) selenite
P115	7446-18-6	Thallium(l) sulfate
P109	3689-24-5	Thiodiphosphoric acid, tetraethyl ester
P045	39196-18-4	Thiofanox
P049	541-53-7	Thioimidodicarbonic

Hazardous Waste No.	Chemical Abstracts No.	Substance
		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, 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

Appendix D - Non-Specific Sources: Complete F List (§261.31 Hazardous wastes from non-specific sources) **(a) The following solid wastes are listed hazardous wastes from non-specific sources unless they are excluded under §260.20 and §260.22.**

Industry and EPA hazardous waste No.	Hazardous waste	Hazard code
Generic:		
F001	The following spent halogenated solvents used in degreasing: tetrachloroethylene, trichloroethylene, methylene chloride, 1,1,1-trichloroethane, carbon tetrachloride, and chlorinated fluorocarbons; all spent solvent mixtures/blends used in degreasing containing, before use, a total of ten percent or more (by volume) of one or more of the above halogenated solvents or those solvents listed in F002, F004, and F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.	(T)
F002	The following spent halogenated solvents: tetrachloroethylene, methylene chloride, trichloroethylene, 1,1,1-trichloroethane, chlorobenzene, 1,1,2-trichloro-1,2,2-trifluoroethane, ortho-dichlorobenzene, trichlorofluoromethane, and 1,1,2- trichloro-ethane; all spent solvent mixtures/blends containing, before use, a total of ten percent or more (by volume) of one or more of the above halogenated solvents or those listed in F001, F004, and F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.	(T)
F003	The following spent non-halogenated solvents: xylene, acetone, ethyl acetate, ethyl benzene, ethyl ether, methyl isobutyl ketone, n-butyl alcohol, cyclohexanone, and methanol; all spent solvent mixtures/blends containing, before use, only the above spent non-halogenated solvents; and all spent solvent mixtures/blends containing, before use, one or more of the above non-halogenated solvents, and a total of ten percent or more (by volume) of one or more of those solvents listed in F001, F002, F004, and F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.	(I)*
F004	The following spent non-halogenated solvents: cresols and cresylic acid, and nitrobenzene; all spent solvent mixtures/blends containing, before use, a total of ten percent or more (by volume) of one or more of the above non-halogenated solvents or those solvents listed in F001, F002, and F005; and still bottoms from the recovery of those spent solvents and spent solvent mixtures.	(T)
F005	The following spent non-halogenated solvents: toluene, methyl ethyl ketone, carbon disulfide, isobutanol, pyridine, benzene, 2-ethoxyethanol, and 2-nitropropane; all spent solvent mixtures/blends containing, before use, a total of ten percent or more (by volume) of one or more of the above non-halogenated solvents or those solvents listed in F001, F002, and F004; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.	(I,T)*
F006	Wastewater treatment sludges from electroplating operations except from the following processes: (1) sulfuric acid anodizing of aluminum; (2) tin plating on carbon steel; (3) zinc plating (segregated basis) on carbon steel; (4) aluminum or zinc-aluminum plating on carbon steel; (5) cleaning/stripping associated with tin, zinc and aluminum plating on carbon steel; and (6) chemical etching and milling of	(T)

	aluminum.	
F007	Spent cyanide plating bath solutions from electroplating operations.	(R,T)
F008	Plating bath residues from the bottom of plating baths from electroplating operations where cyanides are used in the process.	(R,T)
F009	Spent stripping and cleaning bath solutions from electroplating operations where cyanides are used in the process.	(R,T)
F010	Quenching bath residues from oil baths from metal heat treating operations where cyanides are used in the process.	(R,T)
F011	Spent cyanide solutions from salt bath pot cleaning from metal heat treating operations.	(R,T)
F012	Quenching waste water treatment sludges from metal heat treating operations where cyanides are used in the process.	(T)
F019	Wastewater treatment sludges from the (T) chemical conversion coating of aluminum except from zirconium phosphating in aluminum can washing when such phosphating is an exclusive conversion coating process.	(T)
F020	Wastes (except wastewater and spent carbon (H) 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.)	(H)
F021	Wastes (except wastewater and spent (H) 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.	(H)
F022	Wastes (except wastewater and spent (H) 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.	(H)
F023	Wastes (except wastewater and spent (H) 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.)	(H)
F024	Process wastes, including but not limited (T) to, distillation residues, heavy ends, tars, and reactor clean-out wastes, from the production of certain chlorinated aliphatic hydrocarbons by free radical catalyzed processes. These chlorinated aliphatic hydrocarbons are those having carbon chain lengths ranging from one to and including five, with varying amounts and positions of chlorine substitution.	(T)

	(This listing does not include wastewaters, waste-water treatment sludges, spent catalysts, and wastes listed in §261.31 or §261.32).	
F025	Condensed light ends, spent filters and (T) filter aids, and spent desiccant wastes from the production of certain chlorinated aliphatic hydrocarbons, by free radical catalyzed processes. These chlorinated aliphatic hydrocarbons are those having carbon chain lengths ranging from one to and including five, with varying amounts and positions of chlorine substitution.	(T)
F026	Wastes (except wastewater and spent (H) 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.	(H)
F027	Discarded unused formulations containing (H) tri-, tetra-, or pentachlorophenol discarded unused formulations containing compounds derived from these chlorophenols. (This listing does not include formulations containing Hexachlorophene synthesized from prepurified 2,4,5-trichlorophenol as the sole component.)	(H)
F028	Residues resulting from the incineration (T) or thermal treatment of soil contaminated with EPA Hazardous Waste Nos. F020, F021, F022, F023, F026, and F027	(T)
F032	Wastewaters (except those that have not (T) come into contact with process contaminants), process residuals, preservative drippage, and spent formulations from wood preserving processes generated at plants that currently use or have previously used chlorophenolic formulations (except potentially cross-contaminated wastes that have had the F032 waste code deleted in accordance with §261.35 of this chapter or potentially cross-contaminated wastes that are otherwise currently regulated as hazardous wastes (i.e., F034 or F035), and where the generator does not resume or initiate use of chlorophenolic formulations). This listing does not include K001 bottom sediment sludge from the treatment of wastewater from wood preserving processes that use creosote and/or pentachlorophenol.	(T)
F034	Wastewaters (except those that have not (T) come into contact with process contaminants), process residuals, preservative drippage, and spent formulations from wood preserving processes generated at plants that use creosote formulations. This listing does not include K001 bottom sediment sludge from the treatment of wastewater from wood preserving processes that use creosote and/or pentachlorophenol.	(T)
F035	Wastewaters (except those that have not (T) come into contact with process contaminants), process residuals, preservative drippage, and spent formulations from wood preserving processes generated at plants that use inorganic preservatives containing arsenic or chromium. This listing does not include K001 bottom sediment sludge from the treatment of wastewater from wood preserving processes that use creosote and/or pentachlorophenol.	(T)
F037	Petroleum refinery primary oil/water/ (T) solids separation sludge -- Any sludge generated from the gravitational separation of oil/water/solids during the storage or treatment of process wastewaters and oily cooling wastewaters from petroleum refineries. Such sludges include, but are not limited to, those generated in: oil/water solids separators; tanks and impoundments; ditches and other conveyances;	(T)

	sumps; and stormwater units receiving dry weather flow. Sludge generated in stormwater units that do not receive dry weather flow, sludges generated from non-contact once-through cooling waters segregated for treatment from other process or oily cooling waters, sludges generated in aggressive biological treatment units as defined in § 261.31(b)(2) (including sludges generated in one or more additional units after wastewaters have been treated in aggressive biological treatment units) and K051 wastes are not included in this listing.	
F038	Petroleum refinery secondary (emulsified) (T) oil/water/solids separation sludge -- Any sludge and/or float generated from the physical and/or chemical separation of oil/water/solids in process wastewaters and oily cooling wastewaters from petroleum refineries. Such wastes include, but are not limited to, all sludges and floats generated in: induced air flotation (IAF) units, tanks and impoundments, and all sludges generated in DAF units. Sludges generated in stormwater units that do not receive dry weather flow, sludges generated from non-contact once-through cooling waters segregated for treatment from other process or oily cooling waters, sludges and floats generated in aggressive biological treatment units as defined in § 261.31(b)(2) (including sludges and floats generated in one or more additional units after wastewaters have been treated in aggressive biological treatment units) and F037, K048, and K051 wastes are not included in this listing.	(T)
F039	Leachate (liquids that have percolated (T) through land disposed wastes) resulting from the disposal of more than one restricted waste classified as hazardous under Subpart D of this Part. (Leachate resulting from the disposal of one or more of the following EPA Hazardous Wastes and no other Hazardous Wastes retains its EPA Hazardous Waste Number(s): F020, F021, F022, F026, F027, and/or F028).	(T)

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*(I,T) should be used to specify mixtures containing ignitable and toxic constituents.

(b) Listing Specific Definitions:
(1) For the purposes of the F037 and F038 listings, oil/water/solids is defined as oil and/or water and/or solids.
(2)(i) For the purposes of the F037 and F038 listings, aggressive biological treatment units are defined as units which employ one of the following four treatment methods: activated sludge; trickling filter; rotating biological contactor for the continuous accelerated biological oxidation of wastewaters; or high-rate aeration. High-rate aeration is a system of surface impoundments or tanks, in which intense mechanical aeration is used to completely mix the wastes, enhance biological activity, and
(A) the units employs a minimum of 6 hp per million gallons of treatment volume; and either
(B) the hydraulic retention time of the unit is no longer than 5 days; or
(C) the hydraulic retention time is no longer than 30 days and the unit does not generate a sludge that is a hazardous waste by the Toxicity Characteristic.
(ii) Generators and treatment, storage and disposal facilities have the burden or proving that their sludges are exempt from listing as F037 and F038 wastes under this definition. Generators and treatment, storage and disposal facilities must maintain, in their operating or other onsite records, documents and data sufficient to prove that:
(A) the unit is an aggressive biological treatment unit as defined in this subsection; and
(B) the sludges sought to be exempted from the definitions of F037 and/or F038 were actually generated in the aggressive biological treatment unit.
(3)(i) For the purposes of the F037 listing, sludges are considered to be generated at the moment of deposition in the unit, where deposition is defined as at least a temporary cessation of lateral particle

movement. (ii) For the purposes of the F038 listing,
(A) sludges are considered to be generated at the moment of deposition in the unit, where deposition is defined as at least a temporary cessation of lateral particle movement and
(B) floats are considered to be generated at the moment they are formed in the top of the unit.

[46 FR 4617, Jan. 16, 1981, as amended at 46 FR 27477, May 20, 1981; 49 FR 5312, Feb. 10, 1984; 149 FR 37070, Sept. 21, 1984; 50 FR 665, Jan. 4, 1985; 50 FR 2000, Jan. 14, 1985, 50 FR 53319, Dec. 31, 1985; 50 FR 2702, Jan. 21, 1986; 51 FR 6541, Feb 25, 1986; 54 50977, Dec. 11, 1989; 55 FR 5340, Feb. 14, 1990; 55 FR 22684, June 1, 1990; 55 FR 46354, Nov. 2, 1990; 55 FR 50450, Dec. 6, 1990; 55 FR 3864, Jan. 31, 1991; 56 FR 21955, May 13, 1991; 56 FR 27332, June 13, 1991; 57 FR 61492, Dec. 24, 1992]

Appendix E – Toxic at Specific Concentrations, D-Listed Waste

EPA HW #[1]	Contaminant	Regulatory limit(mg/L)
D004	Arsenic	5.0
D005	Barium	100.0
D018	Benzene	0.5
D006	Cadmium	1.0
D019	Carbon Tetrachloride	0.5
D020	Chlordane	0.03
D021	Chlorobenzene	100.0
D022	Chloroform	6.0
D007	Chromium	5.0
D023	o-Cresol	200.0[2]
D024	m-Cresol	200.0[2]
D025	p-Cresol	200.0[2]
D026	Cresol	200.0[2]
D016	2,4-D	10.0
D027	1,4-Dichlorobenzene	7.5
D028	1,2-Dichloroethane	0.5
D029	1,1-Dichloroethylene	0.7
D030	2,4-Dinitrotoluene	0.13[3]
D012	Endrin	0.02
D031	Heptachlor	0.008
D032	Hexachlorobenzene	0.13[3]
D033	Hexachlorobutadiene	0.5
D034	Hexachloroethane	3.0
D008	Lead	5.0
D013	Lindane	0.4
D009	Mercury	0.2
D014	Methoxychlor	10.0
D035	Methyl ethyl ketone	200.0
D036	Nitrobenzene	2.0
D037	Pentachlorophenol	100.0
D038	Pyridine	5.0
D010	Selenium	1.0
D011	Silver	5.0
D039	Tetrachloroethylene	0.7
D015	Toxaphene	0.5
D040	Trichloroethylene	0.5
D041	2,4,5-Trichlorophenol	400.0
D042	2,4,6-Trichlorophenol	2.0
DO17	2.4.5-TP Silvex	1.0
D043	Vinyl Chloride	0.2

Appendix F - PEROXIDE FORMING CHEMICALS

Peroxide Hazard on Storage: ***Discard After Three Months***	
Divinyl acetylene	Potassium metal
Divinyl ether	Sodium amide
Isopropyl ether	Vinylidene chloride
Peroxide Hazard on Concentration: ***Discard After One Year***	
Acetal	Dioxane
Cumene	Ethylene glycol dimethyl ether (glyme)
Cyclohexene	Furan
Cyclooxyene	Methyl acetylene
Cyclopentene	Methylcyclopentane
Diacetylene	Methyl isobutyl ketone
Dicyclopentadiene	Tetrahydronaphtalene (Tetralin)
Diethyl ether	Tetrahydrofuran
Diethylene glycol dimethyl ether (diglyme)	Vinyl ethers
Hazardous Due to Peroxide Initiation of Polymerization*: ***Discard After One Year***	
Acrylic acid	Styrene
Acrylonitrile	Tetrafluoroethylene
Butadiene	Vinyl acetylene
Chloroprene	Vinyl acetate

Chlorotrifluoroethylene Methyl methacrylate	Vinyl chloride Vinyl pyridine

Peroxide Testing Method

Peroxide forming compounds should be tested on a regular basis to detect the presence of peroxides before they reach dangerous concentrations.

One testing method is the Redox test strip (available through Sigma Aldrich). The strip contains the enzyme peroxidase which transfers oxygen from the peroxide to an organic redox indicator, which is then converted to a blue oxidation product. Follow manufacturer's instructions for testing and interpreting results.

- If the peroxide concentration is greater than 25 ppm, but less than 100 ppm, the chemical may be used, but DO NOT DISTILL OR CONCENTRATE.
- If the peroxide concentration is greater than 100 ppm, it should be considered as potentially explosive and should not be used. It should be disposed of as hazardous waste (see next section).

The following is a discussion of several treatment methods:

Method 1

Hydroperoxides can be removed by passing the solvent through a column of activated alumina. This method works for water-soluble and water-insoluble chemicals. The washed solvent should be retested to ensure that it has been cleaned adequately. The alumina apparently catalyzes the degradation of some peroxides, but in some cases the peroxide may remain intact on the alumina, making it potentially shock sensitive. The alumina can be deactivated by flushing with a dilute acid solution of potassium iodide or ferrous sulfate.

The amount of alumina required depends on the quantity of peroxide. As a start, a column containing 100 g of alumina should be used for 100 mL of solvent. More alumina or passage through a second column may be required to eliminate peroxides. This method is relatively slow and expensive, but it avoids shaking the solvent and does not add water. It will not reliably remove dialkyl peroxides, although there is some controversy about this.

Method 2

Peroxides in water-insoluble chemicals can be removed by shaking with a concentrated solution of ferrous salt; 60 g $FeSO_4$, 6 mL concentrated H_2SO_4, and 110 mL water are a standard solution. Another formulation is 100 g $FeSO_4$, 42 mL concentrated HCl, and 85 mL water. The peroxide former is extracted two to three times with an equal volume of the reagent. Drying over sodium or magnesium sulfate can be used to remove dissolved water. Shaking should be very gentle for the first extraction.

This method has been shown repeatedly to be quite effective for most peroxides, but it is not reliable for removing alkyl peroxides.

Method 3

Blue-indicating molecular sieve (4—8 mesh, type 4A) is added to containers of peroxidized chemicals and allowed to sit for 1–30 days. An amount equivalent to about 5%–10% (wt/vol) of the peroxidized liquid is used. Alternatively, the mixture can be refluxed, and the reaction occurs within 4 hours. The peroxide is broken down, and the indicator in the sieve is consumed. When run at room temperature, this process is apparently safe, slow, and controlled. Dialkyl peroxides are not efficiently removed, especially from dioxane. This method may be particularly suited to treatment of THF, diisopropyl ethers, and diethyl ethers, which may be decontaminated at room temperature in a couple of days.

Appendix G - Instructions for Completing UAH Chemical Waste Inventory

1. **Generator Name (PI):** Print the first and last name of the principal investigator, the lab director or person who is responsible for and knows the hazards of the waste that is generated.
   Annual Clean-Out: Mark yes or no
2. **Building and Room:** Building and room where waste is located.
   Lab Close-Out: Mark yes or no
3. **Emergency Contact Info:** Provide office and after hours phone number for the PI and an alternate emergency contact.
   Scheduled Waste Pick-Up: Mark yes if this is a regularly scheduled waste pick-up.
4. **Department:** The department generating the waste.
5. **Telephone:** The telephone number of the PI or lab point of contact.
   Begin Date: The starting date the chemicals were prepared for pick-up. End Date: The last date the chemicals were prepared for pick-up.
6. **Person Completing Manifest:** The name of the person completing the manifest and preparing the waste for OEHS pickup.
7. **Chemical/Compound:** Identity of the compound or components of a mixture. Use one line for each waste substance. If the material is part of a waste mixture, draw brackets on the left of the first mixture component and after the last component. For example: [methanol, water, acetic acid].
8. **CAS: The chemical abstracts system number**
9. **Conc. / Percent:** Amount of this component in a mixture (estimate as closely as possible in concentrations and or percentages).
10. **Physical Form:** Liquid, gas, solid or aerosol.
11. **Container Size:** Record the size of container. Use the metric system units. Solids in grams (one pound = 454 g), liquids in liters (1.06 quarts = 1 liter).
12. **ContainerType:** Glass bottle, plastic carboy, metal can, jerry can, box, etc.
13. **Number of containers:** How many.

Chemical Hazard Code (FOR OEHS USE ONLY): EPA Hazwaste Code.

General Information:

One copy of the inventory must be placed on the outside of each box of waste components. To have materials picked up, email a copy to the OEHS at greenm@uah.edu. Place a copy on or near the secondary waste container. Keep the original as your record.

NOTE: Shock sensitive and water reactive materials require special handling. Call the OEHS at 2352 for instructions.

Appendix H - Regular Chemical Waste Disposal Schedule

2012	2013
Sept 17-21	**Mar 18-22**
Dec 17-21	**Jun 16-21**
	Sept 16-20
	Dec 16-20

Appendix I - Training Record Form

Course Name:			
Location:	**Date (Begin/End):**		**Time (Begin/End):**
Instructor:			
Attendee Name	**UAH Dept / Division/Campus Address**	**Campus Phone**	**Email Address**

Appendix J – Laboratory Emergency Management Information Sign

(These signs are produced by OEHS upon receipt of lab chemical inventory)

Laboratory Safety Information System

Chemistry Department
Material Science Building
Room 300

Emergency Numbers

824-6911

OEHS Contact: 824-6490
Departmental Contact: Dr. John Doe / 824-XXXX/Emergency No.
Researcher/Post Doc/Graduate Student / 824-XXXX

Safety and Personal Protection Information

Eye Protection		**YES**
Hand Protection		**YES**
Hearing Protection		**NO**

MSDS Location:
Spill Kit Location:

Appendix K – Annual Laboratory Clean-Out Schedule

(Scheduled between semesters)

Annually
May 15 – June 15
July 15 – August 15
December 1 – December 15