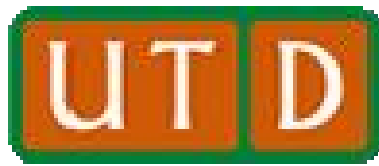


The University of Texas at Dallas Waste Disposal Safety Manual



WASTE DISPOSAL SAFETY MANUAL

Table of Contents

- I. Introduction
- II. Definitions
- III. Federal Hazardous Waste Disposal Regulations
- IV. Texas Hazardous Waste Disposal Regulations
- V. The University of Texas at Dallas Hazardous Waste Disposal Program
- VI. Hazardous Waste Management Practices
- VII. Disposal Methods
- VIII. Emergency Procedures

Appendices

1. The University of Texas at Dallas Hazardous Waste Collection System
2. Hazardous Chemical Waste Form
3. EPA Acutely Hazardous Chemicals List
4. Residues of Hazardous Waste in Empty Containers

I. INTRODUCTION

- A. This manual has been developed to give employees at The University of Texas at Dallas a better understanding of Federal and State hazardous waste disposal regulations and explain the University's program for the mandatory compliance required by these regulations. Information contained in the manual pertains to University operations located on the University campus and any other location wherein The University of Texas at Dallas is responsible for the generation and disposal of hazardous waste.
- B. The University of Texas at Dallas generates no more than 1 kilogram of acute hazardous waste and between 100 kilograms (220 lbs. or about 1/2 of a 55 gallon drum) and 1000 kilograms (2,200 lbs. or about 5/55 gallon drums) of hazardous waste in a calendar month and therefore is classified as a "small quantity generator" (SQG). The program for compliance is very demanding and requires full cooperation by all campus entities. Exceeding the SQG limits could result in significant violations and fines. A positive attitude and commitment by all parties can help reduce escalating disposal costs and minimize the risk of penalties for non-compliance.
- C. Personnel from the University's Safety Office will answer questions and assist departments in every way possible with regard to this program. For additional information contact the Office of Environmental Health and Safety at 4111.

II. DEFINITIONS

- A. "Solid Waste" — any garbage, refuse, sludge from a waste treatment plant, water treatment plant, or air pollution control facility or other discarded material, including solid, liquid, semi-solid, or contained gaseous material resulting from industrial, municipal, commercial, mining and agricultural operations, and from community and institutional activities. Includes hazardous waste and industrial solid waste.
- B. "Hazardous Waste" — any solid waste, or combination of solid waste, material listed or identified in Title 40 Code of Federal Regulations (CFR), Part 261, Subpart C and D, which because of its quantity, concentration, or physical chemical or infectious characteristics may:
- C. "Disposal" — the discharge, deposit, injection, dumping, spilling, or placing of any solid waste or hazardous waste (whether containerized or uncontainerized) into or on any land or water so that such solid waste or any constituent thereof may enter the environment, or may be emitted into the air, or may be discharged into any water, including ground waters.
- D. "Identification Number" — the numbers assigned by the Environmental Protection Agency or the Texas Natural Resource Conservation

Commission to each generator, transporter, and processing, storage or disposal facility. The University's EPA Identification Number is assigned to and administered by the Office of Environmental Health and Safety.

- E. "Facility" — all contiguous land, and structures, other appurtenances, and improvements on the land for storing, processing, or disposing of municipal hazardous waste or industrial solid waste.
- F. "Generator" — any person, by site, who produces municipal hazardous waste or industrial solid waste; any person who possesses municipal hazardous waste or industrial solid waste to be shipped to any other person; or any person whose act first causes the solid waste to become subject to regulation. As a generator of hazardous waste, the University is responsible for the waste from "cradle-to-grave."
- G. "Manifest" — a uniform hazardous waste tracking document which must accompany shipments of municipal hazardous waste or Class I industrial solid waste.
- H. "Permit" — a written permit issued by the Texas Natural Resource Conservation Commission which, by its conditions, may authorize the permittee to construct, install, modify or operate a specified municipal hazardous waste or industrial solid waste storage, processing, or disposal facility in accordance with specified limitations.
- I. "Processing" — the extraction of materials, transfer, volume reduction, conversion to energy, or other separation and preparation of solid waste for reuse or disposal, including the treatment or neutralization of hazardous waste, designed to change the physical, chemical, or biological character or composition of any hazardous waste so as to neutralize such waste, or do as to recover energy or material from the waste, or so as to render such waste non-hazardous or less hazardous, safer to transport, store, and dispose or amenable for recovery, storage, or reduced in volume.
- J. "Recyclable Materials" — wastes that can be recycled. Recycled material consists of used, reused, or reclaimed material.
- K. "Reclaimed Material" — processed or regenerated material recovered as a usable product. Examples include recovery of lead from spent batteries and regeneration of spent solvents.
- L. "Used or Reused Material" — either material that is:
 - 1. Employed as an ingredient (including use as an intermediate) in an industrial process to make a product (for example, distillation bottoms from one process used as feed stock in another process), or
 - 2. Employed in a particular function or application as an effective substitute for a commercial product.

- M. "Storage" — the holding of solid waste for a temporary period, at the end of which the waste is processed, disposed of, recycled, or stored elsewhere.
- N. "Transporter" — any person who conveys or transports municipal hazardous waste or industrial solid waste by truck, ship, pipeline, or other means.

III. FEDERAL HAZARDOUS WASTE DISPOSAL REGULATIONS

The Solid Waste Disposal Act as amended by the Resource Conservation and Recovery Act (RCRA) is administered by the U.S. Environmental Protection Agency (EPA) under Subtitle C, Hazardous Waste Management. RCRA established a "cradle-to-grave" hazardous waste management program to protect public health and the environment from improper disposal of hazardous waste. The RCRA became effective in 1976, subsequent revisions in 1984 resulted in colleges and universities being subject to RCRA Hazardous Waste Management rules.

IV. TEXAS HAZARDOUS WASTE DISPOSAL REGULATIONS

- A. Although RCRA is a Federal regulation, the State of Texas is authorized to administer a similar program under the Texas Solid Waste Disposal Act (Texas Health and Safety Code, Ch. 361) and its regulations (30 TAC §335.001). The Texas Solid Waste Disposal Act is administered by the Texas Natural Resource Conservation Commission (TNRCC).
- B. Hazardous waste generators must not store, process, dispose of, transport, or offer for transportation, hazardous waste without having received an EPA/TNRRC identification number; nor may they offer hazardous waste to transporters or to storage, treatment, or disposal (TSD) facilities that have not received an EPA/TNRRC identification number. Before transporting or offering hazardous waste for transportation to an off-site facility, all requirements of packaging, labeling, marking, and placarding must be met. A uniform hazardous waste manifest must be properly filled out and accompany every shipment.
- C. Only a Federal or State Hazardous Waste Disposal Facility can dispose of hazardous or industrial Class I waste. A limited number of facilities have approved landfill, incineration, neutralization, or recycling operations for disposal. A waste generator always retains liability from "cradle-to-grave" for waste which causes health, safety or environmental damage. Since this liability extends indefinitely, the choice of a reliable TSD facility is very important.
- D. A generator without a disposal permit cannot dispose of hazardous waste on-site. However, some empty containers may be disposed of as ordinary waste. Empty containers which have contained an acutely hazardous waste must always be treated as hazardous waste (see Appendix 3) even for disposal. See discussion in VII within.
- E. Penalties in Texas for civil violations are fines up to \$25,000 per day per

violation. Criminal penalties range from fines up to \$250,000 to 15-year prison terms.

V. THE UNIVERSITY OF TEXAS AT DALLAS HAZARDOUS WASTE DISPOSAL PROGRAM

- A. The University is a Small Quantity Generator (SQG) of hazardous waste and must comply with the Environmental Protection Agency (EPA) and Texas Natural Resource Conservation Commission's (TNRCC) regulations for this category.
- B. The University's hazardous waste management program must comply with all the "General Facility Standards," including Shipping and Reporting Procedures applicable to Generators of Municipal Hazardous Waste; Accumulation Time; General Waste Analysis; Security; General Inspection Requirements; Personnel Training; General Requirements for Ignitable, Reactive, and Incompatible Wastes; Contingency and Emergency Procedures; Record Keeping and Reporting Requirements; and Use and Management of Containers. See 30 TAC §335.
- C. The hazardous waste management program is administered by the Office of Environmental Health and Safety. Individual departments are responsible for determining what hazardous waste they generate and following University procedures. The University's Hazardous Waste Collection System in Appendix 1 outlines the specific responsibilities and procedures to be used by departments in the University hazardous waste disposal program.
- D. The University is allowed to store hazardous waste for up to 180 days on-site without a storage permit. All waste must then be transported to a permitted off-site facility for further storage, treatment, and/or disposal.

VI. HAZARDOUS WASTE MANAGEMENT PRACTICES

A. MINIMIZING QUANTITIES OF HAZARDOUS WASTE

In the past, it has been a common practice to order larger quantities of chemicals than needed to take advantage of reduced costs. As a result, aging reagents or solvents are left for disposal. Usually disposal costs for these chemicals as hazardous waste is considerably more than the original purchase price. Such large quantity orders should be avoided whenever possible in the future due to rising disposal costs. It has been estimated that as much as 40% of laboratory hazardous waste is unused chemicals. Besides reducing disposal costs, small inventories reduce chemical exposure to personnel. Storage of unused chemicals for extended periods increases the risk of accidents.

Another way of reducing quantities of waste is by precipitating out the active chemicals and drying or filtering the water from the hazardous waste. As waste technology advances, the removal of non-hazardous materials and separation of chemicals from waste is becoming more desirable. This technique is often most easily accomplished at the point of generation. Consult the Office of

Environmental Health and Safety regarding proper procedures.

B. SUBSTITUTION

Substitution of a non-hazardous or less hazardous chemical in place of a hazardous chemical is a commonly used and very effective method of reducing hazards and costs.

1. An example of substitution is to change a cleaning agent from a toxic, flammable solvent to a soap and hot water solution. No hazardous waste is generated in the latter process. Other examples of substitution are the use of a detergent for chromic acid in the cleaning of glassware; the use of water-based contact cement over solvent based; substituting other solvents for benzene, THF, or ether; and the use of other sleep inducers for insects in lieu of hydrogen cyanide.
2. Substitution is not always possible, but should be accomplished when practical.

B. UNKNOWNNS

Unknowns are a special problem in labs, especially labs subject to changeover of management. It is important to clean up a lab and dispose of old, unneeded chemicals before moving. Label all chemicals before they become unknowns. To avoid serious violations, significant fines, and accidents, all chemicals or mixtures and solutions must be clearly labeled at all times. No program may dispose of unknowns. Although analysis is often expensive and time consuming, there is no alternate solution to proper identification of hazardous materials before disposal.

VII. DISPOSAL METHODS

A. SANITARY SEWER

Hazardous chemical waste must not be discharged to the sanitary sewer system under any circumstances. In limited cases, trace amounts of hazardous chemicals, such as quantities associated with washing glassware, may go to the sanitary sewer system but only if it is equipped to handle the chemicals. Check with your Safety Officer first before disposing of rinse water used in washing glassware or other items.

B. ORDINARY TRASH

Empty containers of any chemicals NOT on the EPA's "acutely hazardous" list (Appendix 3) may be disposed of as ordinary trash. "Empty" means the container meets the RCRA definition of empty contained in 40 CFR §261.7 and in Appendix 4. Empty containers of acutely hazardous chemicals must be handled as hazardous waste. Contact the Office of Environmental Health and Safety (ext. 4111) regarding proper disposal. Gloves, paper, etc., may be placed in the regular trash as long as no measurable quantities of any hazardous waste is

present.

Place used "empty" glassware in a marked glassware box.

Containers which held chemicals on the EPA's "acutely hazardous" list MAY NOT be triple rinsed or placed in the regular trash when empty. The Office of Environmental Health and Safety (Ext. 4111) must be called to dispose of these containers to avoid violations.

C. HYPODERMIC NEEDLES AND SCALPELS

Hypodermic needles and scalpel blades (sharps) should be disposed of in accordance with existing TNRCC and Texas Department of Health (TDH) regulations. Sharps should be placed in special hard-side containers. These containers are especially identified as being "sharps containers." Once filled, they will be picked up by the Office of Environmental Health and Safety for disposal at a special waste site.

D. HAZARDOUS WASTE COLLECTION

Chemical waste which meets the current definition of "hazardous," found in Parts II A and B of this section or in the Federal or State Solid Waste Disposal Acts as amended, must be stored by the Office of Environmental Health and Safety for proper disposal. A list of guidelines for packing the waste can be found in Appendix 1, and the necessary form for pickup is in Appendix 2. These instructions should be posted in the work areas for ready reference.

E. UNKNOWNNS

Because of the extreme hazard associated with the handling of unknown materials, no material will be picked up until it is fully identified. The Office of Environmental Health and Safety will assist you in identifying unknowns.

VIII. EMERGENCY PROCEDURES

- A. All departments should make available the campus emergency numbers and develop a response scenario for emergencies.
- B. In an emergency, dial 911 and follow emergency procedures.
- C. Departmental personnel need to be trained on the hazards associated with chemicals used and on how to respond to spills and other emergencies. Material Safety Data Sheets (MSDS) are an excellent source for this information and must be available for all chemicals used or stored within a department (see L-7, VIII). Special clean-up supplies should be available, and employees should be trained on how to use these supplies. The Office of Environmental Health and Safety is available for advice and for verification of proper cleanup. Hazardous waste disposal procedures should be followed for disposal of contaminated clothing, rags, absorbent materials, or other waste from cleanup of hazardous materials spills or leaks. These items should not

be placed in the ordinary trash.

D. HAZARDOUS CHEMICAL SPILLS

1. General Information

- a. Anticipate spills by having the proper safety equipment on hand.
- b. Alert personnel in the area that a spill has occurred.
- c. Do what is necessary to protect life, health, and safety.
- d. Consult the Material Safety Data Sheet (MSDS) which contains special spill cleanup information, if applicable.
- e. If the spill is too large to handle, is a threat to personnel, students or the public, involves radioactive material, involves an infectious agent, or involves a corrosive, highly toxic, or reactive chemical, call for assistance:

University Police - 911

- f. If there is any doubt on how to proceed, call the Office of Environmental Health and Safety for assistance. The Office of Environmental Health and Safety is equipped to handle most spills that can occur at the University.
- g. Contact your supervisor, instructor, or the Office of Environmental Health and Safety for specific spill cleanup information.

2. Low Hazard Material Spills (Spills that are not flammable, toxic, or corrosive [e.g., a salt solution].)

- a. Use an absorbent material that will neutralize the spill if available such as:

Trisodium Phosphate	Powdered Citric Acid
Sand	for Bases

Sodium Bicarbonate	"Oil-Dri", "Zorb-All",
for Acids	"Speedi-Dri", etc.
Paper Towels	

- b. Use a dustpan and brush and wear rubber gloves and goggles.
- c. Decontaminate area with soap and water after cleanup.

- d. Place residue in an appropriate container labeled for waste collection.
- e. Contact the Office of Environmental Health and Safety for disposal information.

3. Volatile, Flammable or Toxic Material Spills

- a. Notify all personnel in the area.
- b. Extinguish flames and all sources of ignition.
- c. Maintain fume hood ventilation.
- d. Vacate the area and call 911 for assistance.
- e. Do not clean up the following compounds—they are very hazardous.

Aromatic Amines	Nitro Compounds
Bromine	Carbon Disulfide
Hydrazine	Cyanides
Nitriles	Ethers
Organic Halides	

- f. If a highly toxic material is spilled, immediately call the University Police at 911.

4. Acid Chloride Spills

- a. Absorb spill with "Oil-Dri," "Zorb-All," "Speedi-Dri," or other clay-type absorbent.
- b. Avoid contact with skin.
- c. Place residue in an appropriate container labeled for hazardous waste collection.
- d. For specific cleanup information, contact your supervisor, instructor, or the Office of Environmental Health and Safety.

5. Mercury Spills

- a. Use a trapped vacuum line attached to a tapered glass tube similar to a medicine dropper to pick up mercury droplets.
- b. Do not use a domestic or commercial vacuum cleaner.
- c. Cover small droplets in accessible areas with one of the following:

- i. Sodium Polysulfide Solution
 - ii. Powdered Sulfur
 - iii. Silver Metal Compounds.
 - d. Place residue in an appropriate container labeled for hazardous waste collection (see Appendix 1).
 - e. For specific cleanup information, contact your supervisor, instructor, or the Office of Environmental Health and Safety.
6. Alkali Metal Spills
 - a. Smother with powdered graphite or "Met-L-X".
 - b. Call 911 for assistance.
 - c. For specific cleanup information, contact your supervisor, instructor, or the Office of Environmental Health and Safety.
7. White Phosphorus
 - a. Smother with wet sand or wet absorbent.
 - b. Call 911 for assistance.
 - c. For specific cleanup information, contact your supervisor, instructor, or the Office of Environmental Health and Safety.

E. INJURY AND ILLNESS

1. Employees and students must notify their immediate supervisor or instructor of all illnesses and injuries related to exposure to hazardous chemicals.
2. Employees and students should report to the Health Center (Ext. 2747), if nonemergency medical attention is required. Students should be accompanied by a friend, teaching assistant, or instructor.
3. If transportation is necessary, the University Police (911) should be called.
4. Do not move seriously injured persons unless they are in further danger.
5. In cases of serious injury or illness, it is imperative appropriate actions be followed immediately.

6. When in doubt as to what should be done, telephone the University Police (911).
7. Tell emergency and medical personnel:
 - a. Your name, location, and nature of the emergency,
 - b. Name of the chemical involved,
 - c. The amount involved,
 - d. Area of the body affected,
 - e. Symptoms.
8. If you have any questions regarding injury and illness procedures, contact your supervisor, instructor, or the Office of Environmental Health and Safety (Ext. 4111).

THE UNIVERSITY OF TEXAS AT DALLAS HAZARDOUS WASTE COLLECTION SYSTEM

The Office of Environmental Health and Safety oversees the disposal of hazardous chemical waste on campus.

Contact the Office of Environmental Health and Safety prior to removing the waste from the laboratory. Decisions on how to best manage the waste are made based on the type and quantity of waste involved. Because of the variety of hazardous chemical wastes generated, it may be necessary to contact the Office of Environmental Health and Safety (ext. 4111) for specific instructions on storage and disposal.

The Office of Environmental Health and Safety does not provide containers for collecting chemical waste. It is the responsibility of each laboratory and shop to provide these containers. The following guidelines are provided to help one obtain a suitable waste container. In addition, please consult with the Office of Environmental Health and Safety, ext. 4111, to avoid costly errors.

1. In all cases, the compatibility of the waste with the container should be the primary consideration. Often, when the waste arrives at the hazardous waste handling facility, it is repacked in its original container and then into a fifty-five gallon drum for transportation and disposal. The second consideration should be the safety of the container during transport; unbreakable containers should be used whenever feasible.
2. For many chemicals, it is appropriate to collect waste or leftover reagents in the original container for disposal. This is especially true for solid chemicals and small quantities of toxic chemicals.
3. Large quantities of flammable liquids should be collected in 2.5 or 5-gallon safety cans. Polyethylene cans are best because of their high resistance to many types of chemicals. The five gallon plastic jugs that some solvents are purchased in are suitable for one-time collection of waste solvents, provided they are the same solvents that were originally in the plastic jugs. Reuse of these containers is discouraged because of their tendency to develop leaks over time. Metal containers of waste will not be accepted.

Chemicals should not be mixed that are not mixed in the experimental process. For examples of incompatible chemicals refer to the Table in this Appendix.

On the following page is a list of waste disposal guidelines which must be posted in a suitable place in each laboratory and shop where hazardous chemical waste is collected.

WASTE DISPOSAL GUIDELINES

PACKAGING

1. Package chemicals in compatible containers, do not use metal.
2. Use unbreakable containers for liquids in quantities greater than one

(1) gallon (4 liters).

3. Do not mix chemicals unless they were mixed in the experiment.
4. Do not fill more than 2/3 of a container.
5. Package mercury separately and under water.
6. Tightly close all containers with the appropriate cap.
7. Use only containers that are clean on the outside with no evidence of spills or drips. Dirty containers will not be picked up.

LABELING

1. All containers and bags must be clearly labeled with the contents of the container and the words, "hazardous waste," if required.
2. If the container contains a cancer-suspect or infectious agent, it must also be noted on the container.
3. Any labels which are incorrect should be defaced and replaced with accurate labels.

COLLECTION

1. One hazardous waste collection form should be made out for each container and should be secured to that container.
2. Information shown on the collection form shall include:
 - (a) Name, department, telephone number and office number of principal investigator,
 - (b) All constituents of the waste material and the amounts listed by proper chemical name (no molecular formulas or abbreviations),
 - (c) Characteristics of the waste material,
 - (d) Dated signature of person completing the form.
3. All constituents of the waste must be listed whether or not the constituent is hazardous. The amount of water is especially important.
4. Once form(s) have been completed, contact the Office of Environmental Health and Safety (ext. 4111) between 8:00 a.m. and 5:00 p.m. to schedule a waste pickup. Do not transport the waste yourself because a secondary containment system is

required to transport chemical waste.

INCOMPATIBLE CHEMICALS

- Certain hazardous chemicals cannot be safely mixed or stored with other chemicals because a severe reaction can take place or an extremely toxic reaction product can result. As a precaution, do not mix any hazardous chemicals that were not mixed during the experiment.
- The label and MSDS will contain information on incompatibilities.
- The following is a table containing examples of incompatible chemicals:

<u>Chemical</u>	<u>Keep Out of Contact With:</u>
Acetic Acid	Chromic acid, nitric acid, hydroxyl compounds, ethylene glycol, perchloric acid, peroxides, permanganates
Acetylene	Chlorine, bromine, copper, fluorine, silver, mercury
Alkali Metals	Water, carbon tetrachloride or other chlorinated hydrocarbons, carbon dioxide, the halogens
Ammonia, Anhydrous	Mercury, chlorine, calcium hypochlorite, iodine, bromine, hydrofluoric acid
Ammonium Nitrate	Acids, metal powders, flammable liquids, chlorates, nitrites, sulfur, finely divided organic or combustible materials
Aniline	Nitric acid, hydrogen peroxide
Bromine	Same as chlorine
Carbon, Activated	Calcium hypochlorite, all oxidizing agents
Chlorates	Ammonium salts, acids, metal powders, sulfur, finely divided organic or combustible materials
Chromic Acid	Acetic acid, naphthalene, camphor, glycerin, turpentine, alcohol, flammable liquids in general
Chlorine	Ammonia, acetylene, butadiene, butane,

	methane, propane (or other petroleum gases), hydrogen, sodium carbide, turpentine, benzene, finely divided metals
Chlorine Dioxide	Ammonia, methane, phosphine, hydrogen sulfide
Copper	Acetylene, hydrogen peroxide
Cumene Hydroperoxide	Acids, organic or inorganic
Flammable Liquids	Ammonium nitrate, chromic acid, hydrogen peroxide, nitric acid, sodium peroxide, halogens
Hydrocarbons	Fluorine, chlorine, bromine, chromic acid, sodium peroxide
Hydrocyanic Acid	Nitric acid, alkali
Hydrofluoric Acid	Ammonia, aqueous or anhydrous
Hydrogen Peroxide	Copper, chromium, iron, most metals or their salts, alcohols, acetone, organic materials, aniline, nitro-methane, flammable liquids, oxidizing gases
Hydrogen Sulfide	Fuming nitric acid, oxidizing gases
Iodine	Acetylene, ammonia (aqueous or anhydrous), hydrogen
Mercury	Acetylene, fulminic acid, ammonia
Nitric Acid	Acetic acid, aniline, chromic acid, hydrocyanic acid, hydrogen sulfide, flammable liquids, flammable gases
Oxalic Acid	Silver, mercury
Perchloric Acid	Acetic anhydride, bismuth and its alloys, alcohol, paper, wood
Potassium	Carbon tetrachloride, carbon dioxide, water
Potassium Chlorate	Sulfuric and other acids

Potassium Permanganate	Glycerin, ethylene glycol, benzaldehyde, sulfuric acid
Silver	Acetylene, oxalic acid, tartaric acid, ammonium compounds
Sodium	Carbon tetrachloride, carbon dioxide, water
Sodium Peroxide	Ethyl or methyl alcohol, glacial acetic acid, acetic anhydride, benzaldehyde, carbon disulfide, glycerine, ethylene glycol, ethyl acetate, methyl acetate, furfural
Sulfuric Acid	Potassium chlorate, potassium perchlorate, potassium permanganate (or compounds with similar light metals, such as sodium, lithium, etc.)

Appendix 2 Hazardous Waste Collection Form

The hazardous waste collection form is available online and it is required that all waste collection requests be submitted online (the form is available under the Environmental Management section of the Environmental Health and Safety website).

The first part of the online form provides information about the generating laboratory or shop. This information enables the Office of Environmental Health and Safety to contact the waste generator if a question arises regarding the characteristics or composition of the waste.

The second part of the online form provides information about the chemical waste to be disposed. This includes chemical constituents and their amounts in the container. All constituents present in measurable quantities must be listed, even if the substance is not a hazardous waste. In order for waste to be disposed of properly, all constituents and characteristics must be listed by proper chemical name (no molecular formulas or abbreviations.)

Appendix 3

ACUTELY HAZARDOUS WASTE CHEMICALS LIST

Empty containers of chemicals on the following list must be treated as hazardous waste.

Acetaldehyde, chloro	Carbon disulfide
Acetamide, 2-fluoro	Carbonic dichloride
Acetamide, N-(aminothioxamethyl)	Chloroacetaldehyde
Acethyl-2-thiourea:1	Chloroaniline:p
Acetic acid, fluoro, sodium salt	Copper cyanide
Acetimidic acid,	Cyanides (soluble cyanide salts) not
N[(methylcarbomoyl)oxy]thio-,methyl est	otherwise specified
Acetyl-2-thiourea:1	Cyanogen
Acrolein	Cyanogen chloride
Aldicarb	Cyclohexyl-4,5-dinitrophenol:2
Aldrin	Dichlorophenylarsine
Allyl alcohol	Diehyl o-pyrazinyl
Aluminum phosphide	Phosphorothidate:0,0
Aminomethyl-3-isoxazolol:5	Dieldrin
Aminopyridine:4-alpha	Diethyl-p-nitrophenyl
Aminothioxomethyl-acetamide:N	Phosphate
Ammonium picrate	Diethylarsine
Ammonium vanadate	Diisopropyl fluorophosphate (dep)
Arsenic acid	Dimethanonaphthalene:1,4:5,8
Arsenic acid As206	Dimethanonaphth[2,3B]oxirane,
Arsenic oxide As206	octahydro:2,7:3,6
Arsenic pentoxide	Dimethanonaphth[2,3B]oxirane:2,7:3,6
Arsenic trioxide	Dimethoate
Arsine, diethyl	Dimethyl-1-(methylthio)2-butanone:3,3
Arsonous dichloride, phenyl	Dimethylphenethylamine:alpha,alpha
Aziridine	Dinitro-o-cresol and salts: 4,6
Barium cyanide	Dinitrophenol: 2,4
Benzenamine, 4-chloro	Dinosob
Benzenamine, 4-nitro	Diphosphoramide, cotamethyl
Benzene, (chloromethyl)	Disulfoton
Benzenediol, 4[1-hydroxy-2-	Dithiobiuret: 2,4
(methylamino) ethyl]: 1,2	Endosulfan
Benzeneethanamine, alpha, alpha-	Endothal
dimethyl	Endrin
Benzopyran-2-one, 4-hydroxy-3-(3-oxo-	Epinephrine
1-phenylbutyl)-salt	Ethyl cyanide
Benzyl chloride	Ethyleneimine
Beryllium dust	Famphur
Bis(chloromethyl)ether	Flouro-acetamide:2
Bromoacetone	Flouro-acetic acid, sodium salt
Brucine	Fluorine
Calcium cyanide	Fluoroacetamide
Carbon bisulfide	Fluoroacetic acid, sodium salt

Fulminic acid, mercury (2+) salt
Heptachlor
Hexaethyltetraphosphate
Hydrazine, methyl
Hydrazinecarbothioamide
Hydrocyanic acid
Hydrogen cyanide
Hydrogen phosphide
Isocyanic acid, methyl ester
Isodrin
Isoxazolone,5-(aminomethyl):3(2H)
Mercury fulminate
Mercury, (acetato-o) phenyl
Methamine, n-methyl-n-nitroso
Methane, oxybis{chloro
Methane, tetranitro
Methanethiol, trichloro
Methano-1h-indene, 1,4,5,6,7,8,8-hepta-
chloro:4-7
Methano-2,4,3-benzodioxathiepen:6,9
Methomyl
Methyl hydrazine
Methyl isocyanate
Methyl parathion
Methylaziridine:2
Methylcarbamoyloxy)thio,methyl ester
acetimidic acid:n
Methylactonitrile:2
Naphthylthiourea:alpha
Nickel carbonyl
Nickel carbonyl,(t-4)
Nickel cyanide
Nicotine and salts
Nitric oxide
Nitroaniline:p
Nitrogen dioxide
Nitrogen oxide no
Nitrogen oxide no2
Nitroglycerine
Nitrosodimethylamine:n
Nitrosomethylvinylamine:n
Octamethylpyrophosphoramidate
Osmium oxide
Osmium tetroxide
Oxabicyclo{2.2.1}heptane-2,3-
dicarboxylic acid:7
Parathion
Phenol,2-4-6-trinitro-, ammonium salt
Phenol,2-4-dinitro
Phenol,2-(1-methylpropyl)4,6-dinitro
Phenol,2-cyclohexy-4,6-dinitro

Phenol,2-methyl-4,6-dinitro-and salts
Phenylmercury acetate
Phenylthiourea
Phoagene
Phosphorodithioic acid, o-o-
dimethyls[2(methylamino)2-oxo
Phorate
Phosphine
Phosphoric acid, diethyl 4-nitrophenyl
ester
Phosphorodithioic acid, o,o-diethyls-[2-
ethylthio]ethyl
Phosphorodithioic acid, o-
dimethyls[2(methylamino)2-ox
Phosphorothioic acid,o,o-diethyl-(4-
nitrophenyl) ester
Phosphorothioic acid, o, o-diethyl-o-
pyrazinyl ester
Phosphorothioic acid, o,o-
dimmethylamino)
sulfonyl]phneyester
Phosphorothioic
Acid,o-[4(dimethylamino)sulfonyl]pheny
Plumbane, tetraethyl
Potassium cyanide
Potassium silver cyanide
Propanal, 2-methyl-2(methylthio), O-
[(methylamino)
carbony
Propanenitrile
Propanenitrile, 2-hydroxy-2-methyl
Propanenitrile, 3-chloro
Propanetriol, trinitrate:1,2,3
Propanone, 1-bromo:2
Propargyl alcohol
Propen-1-ol:2
Proponel:2
Propylenimine:1,2
Propyn-1-ol:2
Pyridinamine
Pyrophosphoric acid tetraethyl ester
Selenourea
Silver cyanide
Sodium azide
Sodium cyanide
Strontium sulfide
Strychnidin-10-one,2,3-dimethoxy
Strychnidin-10-one, and salts
Strychnidine and salts
Sulfuric acid, thallium(I) salt
Tetraethyldithiopyrophosphate

Tetranitromethane
Tetraphosphoric acid, hexaethyl ester
Thallic oxide
Thallium (I) selenite
Thallium (I) sulfate
Thallium (III) oxide
Thiodiphosphoric acid, tetraethyl ester
Thiofanox
Thioimidodicarbonic diamide
Thiophenol
Thiosemicarbazide
Thiourea, (2-chlorophenyl)
Thiourea, 1-naphthalenyl
Thiourea, phenyl
Toxapene
Trichloromethanethiol
Vanadic acid, ammonium salt

Appendix 4

40 CFR §261.7

Residues of Hazardous Waste in Empty Containers

(a)(1) Any hazardous waste remaining in either (i) an empty container or (ii) an inner liner removed from an empty container, as defined in paragraph (b) of this section, is not subject to regulation under parts 261 through 265, or part 268, 270 or 124 of this chapter or to the notification requirements of section 3010 of RCRA.

Any hazardous waste in either (i) a container that is not empty or (ii) an inner liner removed from a container that is not empty, as defined in paragraph (b) of this section, is subject to regulation under parts 261 through 265, and parts 268, 270 and 124 of this chapter and to the notification requirements of section 3010 of RCRA.

(b)(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, 261.32, or 261.33(e) of this chapter is empty if:

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

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

(iii)(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 110 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 110 gallons in size.

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

A container or an inner liner removed from a container that has held an acute hazardous waste listed in §261.31, 261.32, or 261.33(e) is empty if:

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

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

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

removed.