



A Guide to Hazardous Waste Management at Tribal Health Care Clinics



SCIENCE

Disclaimer

This document was developed to provide information on hazardous waste management to out-patient health care facilities operated by Tribes and/or the U. S. Indian Health Service. The information provided may be useful to other facilities that generate hazardous waste. This document is an outline of requirements. It is not intended to establish requirements or create rights for any party, nor does it replace the RCRA regulations or statutory requirements. It does not identify all of the requirements in the waste management regulations and should not be relied upon to determine full compliance with the regulations. Please consult the actual regulations for additional information. These regulations can be found on the RCRA web site at www.epa.gov/lawsregs/laws/rcra.html. For waste managed outside of a reservation, state rules would apply and may be more stringent than the federal rules. In some cases a Tribe may have rules that apply on a specific reservation.

Hazardous Waste



Health care facilities generate a wide variety of wastes. Some of these wastes are regulated as hazardous waste by federal law under the Resource Conservation and Recovery Act (RCRA). This law requires waste generators to determine whether any of their wastes are considered hazardous waste. Once identified as a hazardous waste, the waste must be handled in a manner that conforms to all EPA regulations regarding hazardous waste (Title 40 of the Code of Federal Regulations (CFR) Parts 260 through 279). To determine if your waste is regulated as a hazardous waste you must answer six questions.

Is it a solid waste?

Only a “solid waste” can be a hazardous waste. The regulation defines solid waste as any material that is discarded by being either abandoned, inherently waste-like, or recycled (by being applied to the ground, burned for energy recovery, reclaimed or speculatively accumulated). It can be a solid, liquid or contained gas. For more details on this definition see 40 C.F.R. Parts 260 and 261

Is it excluded?

Certain wastes are excluded from the definitions of solid waste or hazardous waste. For example, wastes being recycled or reused (e.g. by being used as an ingredient in a process to make a product or returned to the original manufacturing process as a substitute for feedstock) may be excluded. To determine if your waste is excluded refer to the regulations at 40 CFR Part 261 Subpart E or contact EPA.

Is it a listed waste?

There are four categories of hazardous waste. Each category includes a list of specific wastes that are always considered to be hazardous waste. The four categories found in 40 C.F.R. Part 261 are described below:

F- listed – Includes certain listed wastes generated from general production and maintenance processes. Examples of these wastes from the healthcare

industry include but are not limited to acetone, toluene, methanol, xylene, methylene chloride, and carbon tetrachloride. These chemicals are usually used in maintenance or laboratory activities.

K- listed - Includes certain listed wastes that are generated from specific industrial processes. Typically, these wastes are not generated at healthcare facilities

P-listed – Includes certain listed chemical products that are being discarded for a variety of reasons. These wastes are considered ‘*acute hazardous waste*’. Some common P listed wastes that may be generated in healthcare clinics appear in Appendix A.

U-listed – Includes certain listed chemical products that are being discarded for a variety of reasons but are not ‘*acute hazardous waste*’. Some common U listed wastes that may be generated in healthcare clinics appear in Appendix A.

Is it characteristic?

If a waste is not a listed hazardous waste, then the generator must determine if it exhibits one of the four hazardous waste characteristics described below.

Ignitability - In general, a waste that easily catches fire (i.e. a liquid that is <24% alcohol with a flash point less than 140°F). For example some degreasing solvents are ignitable.

Corrosivity - In general, liquids with a pH <2 or >12.5, or liquids that corrode steel at a faster rate than a ¼ inch per year at 55°C. Examples are muriatic acid and caustic solutions.

Reactivity - In general, wastes that generate toxic gases or are capable of exploding when exposed to water. Wastes that, when heated under confinement or exposed to a strong initiating source, may ignite or explode. Wastes that generate toxic levels of sulfide or cyanide gas when exposed to pH between 2 and 12.5. Waste that is a forbidden, class A or class B explosive under DOT regulations found in 49 CFR. Examples are sodium metal and dynamite.

Toxicity - In general, wastes that contain high enough levels of one or more of the 40 toxic substances identified in the regulation at 40 CFR Part 261.24 that, when exposed to water in the environment, produce a leachate with toxic constituent concentrations above the limits in the regulation. Examples are heavy metals and some pesticides.

Is it a mixture?

A mixture of any hazardous and non-hazardous wastes may be a hazardous waste. Proper disposal depends on the type of hazardous waste in the mix.

Mixtures that contain listed hazardous waste in any amount are always considered listed hazardous waste.

A mixture that contains hazardous waste that has one of the four characteristics of a hazardous waste but is not a listed waste is considered hazardous waste only if the mixture exhibits one or more of the hazardous waste

Hazardous Waste

characteristics. It is illegal to simply dilute a hazardous waste for the purpose of removing a hazardous waste characteristic.

Is it derived from a hazardous waste?

Residues that accumulate from waste treatment processes for treatment of a listed hazardous waste are listed hazardous waste. For example the residue from a distillation unit used to reclaim listed hazardous waste solvents is a listed hazardous waste.



Generator Classification

If you determine that any of your wastes are hazardous waste, then you are a “hazardous waste generator”. If so, you must determine how much hazardous waste you generate in one month to determine your “generator classification”. Generator class is an EPA designation that is based on the amount of hazardous waste your facility has generated. It is used to determine the level of regulation you are subject to. The three classifications are:

- **Conditionally-Exempt Small Quantity Generators (CESQG)**
- **Small Quantity Generators (SQG)**, and
- **Large Quantity Generators (LQG)**

Health clinics operated on Tribal lands typically are Conditionally-Exempt Small Quantity or Small Quantity Generators. Both classifications limit the amount of hazardous waste that may be accumulated on-site, require identification of all hazardous wastes, and specify the requirements for proper treatment or disposal of the hazardous waste from your facility. A full explanation of generator classification and how it applies to your clinic may be found online in the EPA publication *Resources for Hazardous Waste Generators* (see yellow box above). This user friendly document allows the reader to easily navigate the web-links to answer hazardous waste questions about size and storage requirements.

Resources for Hazardous Waste Generators

www.epa.gov/epawaste/hazard/generation/index.htm

This table contains the specific quantity and time limits for each generator classification. It also identifies management standards for each classification.

Note: The numbers at the bottom of each box are citations from federal regulations 40 C.F.R. Parts 261 and 262.

	CESQGs	SQGs	LQGs
Quantity Limits	< 220 lb/month < 2.2 lb/month of acute hazardous waste < 220 lb/month of acute spill residue or soil §261.5(a) and (e)	220 – 2,200 lb/ month < 2.2lb/month of acute hazardous waste < 220 lb/month of acute spill residue or soil §262.34(d)	≥ 2,200 lb/month > 2.2 lb/month of acute hazardous waste > 220 lb/month of acute spill residue or soil §262.34 and §261.5(e)
EPA ID Number	Not required §261.5	Required §262.12	Required §262.12
On-Site Accumulation Quantity	< 2,200 lb < 2.2 lb acute < 220 lb of acute spill residue or soil §§261.5(f)(2) and (g)(2)	< 13,227 lb (6,000 kg) < 2.2 lb acute < 220 lb of acute spill residue or soil §262.34(d)	No limit
Accumulation Time Limits	None §261.5	≤ 180 days or ≤ 270 days (if greater than 200 miles from TSD) §§262.34(d), (e) and (f)	≤ 90 days <180 days (if greater than 200 miles from TSD) §262.34(a)
Storage Requirements	None §261.5	Basic requirements with technical standards for tanks or containers §§262.34(d)(2) and (3)	Full compliance with requirements for tanks, containers, drip pads, or containment buildings §262.34(a)

Waste Accumulation

If your clinic is a hazardous waste generator it is important to understand the accumulation requirements that apply to hazardous waste before it leaves your clinic. As seen in the “Generator Standards” table above, which management standards apply depends on how much hazardous waste you generate. Hazardous waste may be accumulated without a permit in designated accumulation areas. These areas are subject to all applicable requirements (e.g. containers of waste are labeled with the words “hazardous waste” and an accumulation start date for when waste was first placed in the container, and the area is inspected weekly).

A generator may also manage waste in a satellite accumulation area. This is an area at or near the point of hazardous waste generation and under the control of the operator of the process generating the hazardous wastes. Hazardous wastes may be accumulated here until 55 gallons have been collected. Container labels must either identify the contents or say “hazardous waste”. Once you have accumulated 55 gallons you may temporarily hold the waste for 3 days before moving to your designated accumulation area or shipping it offsite.

Accumulation Recommendations

- Use high quality, resealable containers to prevent spills, evaporative losses, and contamination; and keep the lids/seals closed when not in use
- Keep hazardous waste storage area aisles clear of obstructions:
- Allow elbow room to access all containers easily and minimize spills
- Space containers to allow inspection for corrosion and leaks
- Maintain clear, even surfaces on pathways used by workers or equipment
- Keep accumulation areas clean and well-lit
- Stack containers no higher than recommended by manufacturer, in a way which minimizes the potential for tipping, tearing, puncture, or breakage
- Don't stack equipment against containers
- Make sure containers and shelving or storage areas are earthquake safe
- Insulate electrical circuitry and check frequently for corrosion and potential sparking
- Raise drums off floor to prevent corrosion from concrete “sweating”
- Provide secondary containment and maintain proper distance between different materials
- Install sloped concrete floors and curbs or berms for spill containment in areas such as vehicle maintenance
- Cover outdoor waste accumulation areas to prevent contamination of storm water
- Secure waste accumulation areas to minimize liability and hazards of intrusion or dumping

Transportation



All facilities that generate hazardous waste must ensure that any hazardous waste that is shipped off-site is sent to an appropriate facility. Only a registered hazardous waste transporter can transport hazardous wastes. Hazardous waste cannot be shipped to landfills or incinerators that do not have a permit for managing hazardous waste. The U. S. Department of Transportation (USDOT) has specifications that require some loads to be labeled and shipped in a particular manner to ensure on-road safety. Individual states determine the hazardous waste management requirements outside of Indian Country, so check with your state for local requirements.

LQGs and SQGs are required to ship hazardous waste to a designated facility (e.g. a Treatment, Storage or Disposal Facility (TSDF) that has a RCRA permit or an immediate recycler). They must prepare a manifest for each shipment of hazardous waste that leaves their facility. EPA has developed a standard manifest form that must be used nationwide. (For more information on obtaining this form go to the EPA website.) The manifest allows for consistent documentation of all hazardous waste shipments. Manifests must include the name of the transporter, the name of the designated facility receiving the shipment, your EPA ID number, and a description of the waste based on USDOT hazardous materials requirements such as proper shipping name and hazard class. It also must include quantities of waste shipped, the number and types of containers used, and the hazardous waste codes that describe the type of hazardous waste included in the shipment.

For LQGs and SQGs, all paperwork that details the transportation of hazardous waste from your facility must be kept on-site for a minimum of 3 years. This includes a copy of the manifest signed by the transporter, as well as a copy of the manifest signed by the receiving designated facility confirming receipt of the waste by the facility. CESQGs are also encouraged to maintain accurate records of off-site transportation but this is not required. CESQGs must ensure their hazardous waste is delivered to an appropriate disposal or treatment facility. If a CESQG's hazardous waste is improperly disposed of in a landfill that does not have an appropriate permit, then the CESQG may lose its conditionally-exempt status.

Examples of Health Care Clinic Hazardous Waste

Dental Amalgam



The constituent of concern in dental amalgam is mercury. If a clinic is a LQG or SQG and the amalgam contains mercury at or above the regulatory levels for characteristic hazardous waste established in 40 C.F.R. Part 261.24 then it must be managed as a hazardous waste in compliance with all applicable hazardous waste regulations.

If the clinic is a CESQG, EPA strongly recommends that waste amalgam be managed in an environmentally safe manner. Although mercury is stable in the amalgam form, improper disposal may cause the release of mercury into the environment. If the amalgam is incinerated the high temperatures may volatilize the mercury, releasing it into the atmosphere. Since some municipal waste management facilities incinerate, **EPA strongly recommends against throwing away amalgam with the regular garbage.** Some waste water treatment plants incinerate the sludge resulting after treatment, so **EPA strongly recommends against washing amalgam down the drain.** Likewise, **EPA strongly recommends against cleaning amalgam filters in the sink.**

EPA recommends that dental amalgam be recycled in plastic covered containers labeled “**Amalgam for Recycling.**” Here are some questions that you may want to ask the recycler before you give them your waste:

- *What kind of amalgam wastes do you accept? (Non-contact, contact, traps, filters or sludge, etc.)*
- *Do you provide packaging for storage or shipping?*
- *If you do not provide packaging, how should the waste be packaged?*
- *What waste can be packaged together?*
- *Is disinfecting of amalgam waste required?*
- *How should the waste be shipped to your facility?*

- *How much does it cost?*
- *Can we deliver this waste to your facility ourselves?*

Another word of caution: **avoid disposing of dental amalgam with “red bag” waste.** Similar to some sludge and garbage, red bag waste may be incinerated and therefore mercury may be released into the environment. If no amalgam recyclers are available in your area EPA recommends disposing of amalgam as a hazardous waste.

Pharmaceuticals

Unused, expired, or unneeded pharmaceuticals may be considered a hazardous waste. Risks which may make pharmaceuticals hazardous waste include but are not limited to the following:

- The main active ingredient may be toxic
- Preservatives and other ingredients can pose a toxicity hazard over and above the effect of the main active ingredient
- Some common solvents can pose a fire hazard (i.e. they are ignitable)
- A few compounding agents are corrosive, including strong acids with pH less than 2 (such as glacial acetic and carbolic acids) and strong bases with pH greater than 12.5 (such as sodium hydroxide)
- Some compounds are radioactive, including certain chemotherapy drugs, and certain agents that are used as tracers or markers.



Beyond reverse distribution pharmaceuticals are handled based on whether they are a hazardous waste. This can be determined by answering the ‘6 questions for identifying hazardous waste’ on pages 1 and 2 above. Washington State Department of Ecology has devised a comprehensive web-site to help you determine if a pharmaceutical is a hazardous waste. www.ecy.wa.gov/programs/hwtr/pharmaceuticals/index.html

Examples of Health Care Clinic Hazardous Waste

Since pharmaceuticals have the potential to be hazardous waste their disposal is particularly difficult to manage. One resource that is available to manage unused pharmaceuticals is the use of reverse distribution. This option allows the facility to send back the unused but potentially usable portions of the pharmaceutical to the manufacturer for a 'credit'. Pharmaceuticals sent back to the manufacturer are not hazardous waste and therefore do not count when calculating the volume of hazardous waste generated by the facility.

Universal Waste



This category of waste is a category of hazardous waste that is subject to less stringent regulations, e.g. longer accumulation times, and reduced transportation requirements, in order to facilitate recycling. These regulations are found in the Code of Federal Regulations (40 CFR Part 273). There are four main types of Universal Waste:

- **Hazardous Waste Batteries**
- **Hazardous Waste Pesticides**
- **Hazardous Waste Lamps**
- **Mercury Containing Equipment**

Most clinics generate waste in all four universal waste categories, including the mercury containing equipment category. For example, mercury thermometers and mercury sphygmomanometers may be universal waste. Containers of universal waste must be labeled with the words "universal waste" and a description of the contents such as "lamps" or "batteries".

A complete overview of the universal waste regulations can be found at www.epa.gov/epaoswer/hazwaste/id/univwast/index.htm

Under the regulations there are four categories of entities that deal with universal waste:

Universal Waste Handlers

Small Quantity Handlers of Universal Waste (SQHUW)

– accumulate less than 5,000 kg (approximately 11,000 lbs) of all universal waste categories; basic training on proper handling and emergency procedures is required.

Large Quantity Handlers of Universal Waste (LQHUW)

– accumulate 5,000 kg (approximately 11,000 lbs) or more of all universal waste categories; documentation of shipments to and from the LQHUW, an EPA ID number, and stricter employee training requirements are required.

Universal Waste Transporters – transport does not require an EPA manifest during transport but transporters must comply with applicable DOT requirements.

Universal Waste Destination Facilities – treat, dispose of, or recycle a particular category of universal waste; requirements are the same as fully regulated hazardous waste Treatment, Storage, or Disposal Facility (TSDF).

Individual states may choose to add other hazardous waste to their universal waste program to facilitate recycling. To be included the waste must be generated by a wide variety of generators, cannot be exclusive to a specific industry, and it must be hazardous. To find out more about what your individual states regulations on universal waste are visit: www.epa.gov/epaoswer/hazwaste/id/univwast/statespf.htm

Used Oil



Some clinics have maintenance shops that generate used lubricating oils. If these oils are sent off for recycling or burned onsite in a space heater, they are regulated under the used oil regulations found at 40 CFR Part 279. Generators of used oil are required to collect the oil in containers or tanks that are labeled with the words "used oil." A used oil generator may burn the oil it generates without a permit in a space heater at the facility where it is generated. A generator must make sure that used oil shipped offsite is transported by a registered used oil transporter and is sent to a registered used oil processor or burner. If the oil is being sent offsite to be burned at a facility that does not have a permit to burn it, then the generator, the transporter, or the burner must first determine that the used oil meets the specifications in the regulations for burning without a permit.

**Appendix A:
Common EPA- Listed Hazardous Wastes in Healthcare**

Material	Code	Use
Benzyl Chloride	P028	pharmaceutical manufacturing
Arsenic (trioxide)	P012	veterinary medicine, severe parasitic diseases
Arsenic Trioxide	P012	chemotherapy
Chloropropionitrile (3-chloropropionitrile)	P027	pharmaceutical synthesis
Cyanide Salts	P030	laboratory
Epinephrine	P042	emergency allergy kits, certain types of glaucoma, eye surgery, cardiac arrest
Nicotine	P075	smoking cessation, nicotine patches, etc.
Nitroglycerin	P081	coronary vasodilator in angina treatment
Phentermine (Alpha, alpha-Dimethylphenethylamine)	P046	appetite suppressant
Phenylmercuric acetate	P092	bactericide, pharmaceutic aid in contact lens solutions and nasal sprays
Physotigmine	P204	acholinergics (liberates/acts like acetylcholine)
Physotigmine Salicylate	P188	acholinergics (liberates/acts like acetylcholine)
Potassium Silver Cyanide	P099	bactericide
Sodium Azide	P105	chemical preservative in hospitals, laboratories
Strychnine	P108	veterinary tonic and stimulant
Acetone	U002	solvent in pharmaceutical formulations
Acetyl Chloride	U006	cholesterol testing
Acrylonitrile	U009	pharmaceutical manufacturing
Aniline	U012	pharmaceutical manufacturing
Azaserine	U015	antifungal, antineoplastic
Benzidine dichloride (Hexachloropropene)	U243	pathology laboratory
Bromoform	U225	sedative, hypnotic, antitussive
Cacodylic Acid	U136	dermatologic
Carbon Tetrachloride	U211	anthelmintic, pharmaceutical formulations
Chloral Hydrate (Chloral)	U034	cough syrups, sleeping pills
Chlorambucil	U035	chemotherapy
Chlornaphazin	U026	antineoplastic
Chloroform	U044	anesthetic
Creosote	U051	antiseptic, expectorant
Cresols	U052	antiseptics, disinfectants
Cyclophosphamide	U058	chemotherapy
Daunomycin	U059	chemotherapy
o-Dichlorobenzene	U070	germicides, pharmaceutical manufacturing
m-Dichlorobenzene	U071	germicides, pharmaceutical manufacturing
p-Dichlorobenzene	U072	germicides, pharmaceutical manufacturing
Diethylstilbestrol	U089	anticancer agent, contraceptive
Ethyl Acetate	U112	drug flavoring agent, topical anesthetic
Ethyl Carbamate	U238	antineoplastic
Ethyl Ether	U117	disinfectant, anesthetic
Ethylene Oxide	U115	high level sterilant for surgical instruments
Formaldehyde	U122	antiseptic, disinfectant, preservative
Formic Acid	U123	diuretic, heart and muscle treatment
Hexachloroethane	U131	anthelmintic (anti-worm treatment)
Hexachlorophene	U132	skin treatment (pHisoHex™, Septisol™)
Hexachloropropene	U243	dialysis, pesticide (Septisol foam?) [note ref to Septisol as hexachlorophene -no hits on "hexachloropropene Septisol"]
Lindane	U129	scabicide

Appendix A:
Common EPA- Listed Hazardous Wastes in Healthcare (cont.)

Material	Code	Use
Melphalan	U150	chemotherapy
Maleic Anyhydride	U147	pharmaceutical manufacture
Mercury	U151	preservatives (thimerosal), antiseptics (mercurochrome), devices (thermometers, sphygmomanometers, others)
Methanol	U154	solvent in pharmaceutical manufacture
Methylpyrilene	U155	antihistamine
Methylthiouracil	U164	thyroid inhibitor
Mitomycin	U010	chemotherapy
Naphthalene	U165	antiseptic, anthelmintic
N-butyl alcohol	U031	bactericide, pharmaceutical manufacture, pain control, anti-hemorrhagic
P-Chloro-m-Cresol	U039	antiseptic
Paraldehyde	U182	sedative, hypnotic
Phenacetin	U187	analgesic, antipyretic
Phenol	U188	antiseptic, anesthetic, antipruritic (relieves itching)
Reserpine	U200	hypertension, insanity, snakebite, cholera, horse tranquilizer
Resorcinol	U201	acne, dandruff treatment, intermediate in pharmaceutical synthesis
Saccharin	U202	sugar substitute, food preparation
Selenium sulfide	U205	shampoos
Streptozotocin	U206	chemotherapy
Tetrachloroethylene	U210	anthelmintic
Uracil mustard	U237	chemotherapy
Thiram	U244	antiseptic
Trichloroethylene	U228	inhalation anesthetic, pharmaceutical manufacture
Warfarin < 0.3%	U248	anticoagulant
2-Chloroethyl Vinyl Ether	U042	anesthetics and sedatives manufacture
3-Methylchloranthrene	U157	cancer research

Appendix B: Hazardous Waste

Hazardous Wastes and Substances	Department Commonly Found	Use or Source	Available Alternatives	Additional Management Comments
Acids, caustics, pesticides	Maintenance	Janitorial supplies		Hazardous waste; neutralize acids/ bases
Air emissions from spraying pesticides	Grounds Keeping	Chemical pesticide spraying or evaporation	Minimize use of volatile organic pesticides. Use integrated pest management.	<ul style="list-style-type: none"> • Avoid creating dust and don't allow material to blow around • Cover containers to avoid evaporation
Batteries: Mercury, lead acid, cadmium, nickel	All Departments	<ul style="list-style-type: none"> • Hearing aids and pacemakers • PDAs and digital cameras • Communication devices 	<ul style="list-style-type: none"> • Rechargeable batteries • Lithium or alkaline • Zinc air 	Manage as hazardous or universal waste
Biomedical / infectious waste	<ul style="list-style-type: none"> • Sterile Reprocessing • Dental Services • Housekeeping • Maintenance 	<ul style="list-style-type: none"> • Sharps • Body fluid saturated materials • Specimens / tissue 	Separate municipal solid waste (sharps in separate container)	Store/ dispose biomedical waste in red bags or puncture-resistant containers. Use biomedical waste hauler and facility
Caustics, ions, cat ions	Maintenance	<ul style="list-style-type: none"> • Boilers • Water treatment 	Use ozonation or filtration systems	Segregate reactive and incompatible chemicals
Chemotherapy and antineoplastics	<ul style="list-style-type: none"> • Out-Patient Care • Pharmacy 	Patient treatment	<ul style="list-style-type: none"> • Reduce volumes used. • Centralize chemo compounding 	Use pre-made compounds. Bulk chemo wastes are hazardous wastes.
ChromiumChromic Acid	<ul style="list-style-type: none"> • Dental Services • Radiology 	<ul style="list-style-type: none"> • X-ray developer • Glassware • Tank cleaners • Waste water 	<ul style="list-style-type: none"> • Use non-chromium cleaners. • Used precharged slides or silane 	Hazardous waste
Cleaning Chemicals, Waxes	<ul style="list-style-type: none"> • Administration & Purchasing • Housekeeping 	<ul style="list-style-type: none"> • Cleaning Disinfecting • Maintaining surfaces 	Eliminate strippers and waxes containing zinc	Use least-toxic products, avoid spills, prepare only needed amount. Store in secondary containment. Never discharge concentrated disinfectant into sewer
Contaminated pesticide containers	Grounds Keeping	<ul style="list-style-type: none"> • Pesticides • Fertilizers 	<ul style="list-style-type: none"> • Rinse / wash • Return for recycling 	Hazardous waste: manage properly
Disinfectants, sulfuric acid, sodium hydroxide	Maintenance	Water treatment systems	Use sodium hypochlorite systems, bromine, peracetic acid	Waste treatment chemicals may be hazardous waste
Electronic waste / Computer waste (lead, mercury-containing waste)	All Departments	<ul style="list-style-type: none"> • Cathode Ray Tubes (CRTs) • Monitors • Hard drives 	<ul style="list-style-type: none"> • Recycle • Send for re-use • Use vendor take-back program 	
Ethylene oxide (EtO) with 88% Freon-based carrier	<ul style="list-style-type: none"> • Sterile Reprocessing • Out-Patient Care 	Sterilization (heated)	Consider using steam or sonic sterilization	<ul style="list-style-type: none"> • EPA regulates Freon. Recover and dispose of EtO and Freon as hazardous waste • Filter air and dispose of spent filters as hazardous waste • Steris, Sterad, Sterilox

Appendix B: Hazardous Waste (cont.)

Hazardous Wastes and Substances	Department Commonly Found	Use or Source	Available Alternatives	Additional Management Comments
Glutaraldehyde, formaldehyde, xylene, and alcohols	<ul style="list-style-type: none"> • Sterile Reprocessing • Dental Services • Out-Patient Care 	<ul style="list-style-type: none"> • Cleaning and sanitizing • Disinfecting • Sterilizing • Chemiclaves 	Autoclaves/ sonic sterilization, Microwave, electron beam, gas plasma, hydrogen peroxide	Aldehydes can be neutralized by using glycine or other neutralizers. Never discharge to septic system. Use proper ventilation and staff medical monitoring. Count as treated hazardous waste. Note: Cidex OPA is not recommended for use in chemiclaves.
Glutaraldehyde, Cidex, Glutarex, Sonacide Phenolic disinfectants	<ul style="list-style-type: none"> • Sterile Reprocessing • Dental Services • Housekeeping 	<ul style="list-style-type: none"> • Cold Sterilization • Preservation • Disinfection 	<ul style="list-style-type: none"> • Use non-hazardous substance or non-inhalation hazard sterilization equipment • Nitrile gloves and personal protection equipment • Consider quaternary amine disinfectants, Cidex OPA, peracetic acid 	Use gloves and personal protection equipment. Use proper ventilation. Never discharge into septic system, even if neutralized. Can be neutralized and discharged to sewer. Count as treated hazardous waste.
Green waste	Grounds Keeping	Grounds maintenance	Reduce waste by using Integrated Pest Management	Compost green waste.
Hazardous waste pharmaceuticals	<ul style="list-style-type: none"> • Dental Services • Out-Patient Care • Pharmacy 	<ul style="list-style-type: none"> • Cresols and Lindane • Mercury based preservatives • Unused / outdated medications, controlled substances 	<ul style="list-style-type: none"> • Return to manufacturer • Use reverse distribution 	<ul style="list-style-type: none"> • Inventory often • Use first in – first out system • Hazardous waste; do not discharge to sewer
Lead	<ul style="list-style-type: none"> • Dental Services • Out-Patient Care • Radiology 	<ul style="list-style-type: none"> • Lead boxes and foil packets • Aprons • Autoclave indicator tape 	<ul style="list-style-type: none"> • Recycle • Use non-lead autoclave tape 	Manage as Hazardous waste
Mercury	All Departments	<ul style="list-style-type: none"> • Thermometers • Barometers • Sphygmomanometers 	<ul style="list-style-type: none"> • Alcohol thermometers • Digital equipment 	Can be recycled as Universal or hazardous waste
Mercury	Out-Patient Care	<ul style="list-style-type: none"> • Monitoring devices • Miller-Abbot tubing 	<ul style="list-style-type: none"> • Digital equipment • Tungsten-filled G.I. tubing and bougies • Anderson tubes 	Phase out mercury-containing devices or equipment. Hurst and Malone have mercury- / PVC- free tubing
Mercury	All Departments	<ul style="list-style-type: none"> • Light bulbs, lamps, and older microwaves • Mercury thermostats • Mop water from cleaning floors 	<ul style="list-style-type: none"> • Low-mercury or energy-efficient lamps • Newer microwaves • Digital thermostats • Mercury-free switches and batteries 	Check Universal Waste regulations to find out which can be disposed under the Universal Waste Rules and which ones must be managed as hazardous waste. Keep bulbs and lamps intact; recycle. Clean up mercury spills properly and keep spill kits readily available.

Appendix B: Hazardous Waste (cont.)

Hazardous Wastes and Substances	Department Commonly Found	Use or Source	Available Alternatives	Additional Management Comments
Mercury (thimerosal) and mercury-containing items and monitoring devices	Pharmacy	<ul style="list-style-type: none"> • Pharmaceuticals • Mercurochrome, ophthalmic products, nasal sprays, vaccines, preservatives 	Use non-mercury containing medications, devices and equipment	Hazardous waste. Collect, recycle, reuse, or dispose of as hazardous or universal waste.
Municipal Solid Waste (MSW)	All Departments	<ul style="list-style-type: none"> • Packaging • Paper • Disposable Items 	<ul style="list-style-type: none"> • Request less packaging • Segregate wastes • Minimize by purchasing in bulk • Use vendor take-back program 	<ul style="list-style-type: none"> • Recycle, reuse. • Follow hauler's waste separation specifications. Recycle glass, cardboard, aluminum cans, scrap wood and metal, etc., whenever possible.
Organophos-phates, chlorinated or heavy metals, other chemicals	Grounds Keeping	Pesticides and fertilizers for pest and weed control, ground maintenance	Use Intrgrated Pest Management practices	Use pest-resistant and native species. Use non-chemical/ least toxic alternatives. Minimize use of dangerous waste chemicals.
Pesticide or fertilizers contaminated storm drain runoff	<ul style="list-style-type: none"> • Grounds Keeping • Housekeeping 	<ul style="list-style-type: none"> • The application of pesticides and fertilizers • Vegetation watering 	Use pest resistant native vegetation species that require less use of pesticides and watering	Do not allow runoff of pesticides and fertilizers. Minimize the use of water pesticides and fertilizers by using IPM and Xeriscape techniques.
Pressurized canisters and containers	Grounds Keeping	<ul style="list-style-type: none"> • Sprayers • Pesticide containers • Fertilizer containers 	Use refillable containers (always triple rinse before using another product)	Rinsates may designate as hazardous waste. Return pressurized canisters or containers for refill or reuse to distributor.
Selenium	<ul style="list-style-type: none"> • Pharmacy • Radiology 	<ul style="list-style-type: none"> • Toners • Dandruff shampoos 	Use sodium selenate, not cysteine broth-Apple cider vinegar rinse	Replace with selenium-free version. Minimize use of medicated shampoo.
Silver	<ul style="list-style-type: none"> • Dental Services • Radiology 	<ul style="list-style-type: none"> • Spent X-ray fixer • Processor solution 	<ul style="list-style-type: none"> • Use digital systems • Recycle on- or off- site 	Manage as hazardous waste or recycle. Don't discharge waste water. Use cation exchange, electrolytic recovery, steel wool filtration for silver recovery. Recycle x-ray film.
Silver nitrate	Pharmacy	Burn medicines	Use alternative anti-bacterial creams	Manage silver concentrations of 5 ppm or more as hazardous waste.
Solvents (alcohols, ketones and chlorinated compounds)	Medical Equipment Maintenance	<ul style="list-style-type: none"> • Equipment maintenance • Cleaning 	Aqueous-based cleaners or non-chlorinated solvents	Segregate solvent wastes, distill, reuse or dispose of as hazardous waste.
Solvents, paints, turpentine, strippers, oils, decalcifiers, disinfectants, hydraulic fluids, pesticides	Maintenance	<ul style="list-style-type: none"> • Cleaning • Painting • Pest Management 	<ul style="list-style-type: none"> • Eco Safe • BioKleen 	Don't use chlorinated products. Use reusable or recyclable tote drums. Manage used oils, sludges, and other hazardous wastes appropriately.
Toner cartridges	Administration & Purchasing	<ul style="list-style-type: none"> • Copiers • Printers 	<ul style="list-style-type: none"> • Recycle • Use vendor take-back programs 	

**Appendix B:
Hazardous Waste (cont.)**

Hazardous Wastes and Substances	Department Commonly Found	Use or Source	Available Alternatives	Additional Management Comments
Tributyltin (chloride, neoeconate, bis tributyltin oxide, benzoate, etc.)	Housekeeping	Mildew control in shampoos, lavatory and germicidal cleaners		Pesticide wastes are hazardous wastes, manage properly.
Waste water containing hazardous wastes	<ul style="list-style-type: none"> • Medical Equipment Maintenance • Sterile Reprocessing • Grounds Keeping • Pharmacy 	Hazardous wastes	Reduce generation of hazardous waste	Do not dispose untreated hazardous waste into the sewer system. Contact Ecology or local wastewater facility for exact disposal regulations for your area.
Zinc-based compounds	Dental Services	Cements		Don't discharge into sewer. May be disposed as a solid waste.



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