

WASTE DISPOSAL AT AWBERC

SAFETY!

LABORATORY WASTE MANAGEMENT GUIDELINES

- BIOLOGICAL
- CHEMICAL

BIOLOGICAL WASTE MANAGEMENT GUIDELINES*

A. Responsibility for Safe Practices

1. Non-conformance with safe laboratory practices can result in penalties ranging from loss of permit to criminal negligence under OSHA and SARA "Right-To-Know" Statutes.
2. Supervisory personnel initiate statutory "Chain-Of-Custody" when signing waste disposal forms; accurate identification must be assured.

B. Overview of Temperature Decontamination Procedures

1. Decontamination of:

- glassware and plastic ware
- towels, lab coats, gloves
- spent media, sewage, sludge water and waste water samples, filters
- other autoclavable infectious material, equipment, apparatus

Autoclave at 121°C for 30 minutes, or longer according to volume/size (see tables for minimum sterilization conditions)

2. Disposal:

- glassware, small equipment to Preparation Room 388 for cleaning
- towels and lab coats to laundry
- spent media, sewage, sludge to sink/sewer system**
- broken/discarded glass to glass bin
- disposable plastic items (pipettes, syringes, petri dishes, test tubes, etc.), filters, paper cloth to trash container (lined with 50 mil. plastic bag)

** Primary sludge with rapid-settling solids may require a flushable drain, or drumming for shipment to sewage plant.

C. Overview of Chemical Decontamination Procedures

1. Gas sterilizer (ethylene oxide)

Decontamination of:

- reusable filters
- filter housings
- hoses
- non-autoclavable equipment, apparatus

Treat moistened non-autoclavable items for 4 hours, 2 hours if dry, then aerate for 2 hours. Extend (>2 hrs.) for porous plastics.

Disposal:

- none; items are washed and reused.

* References:

Laboratory Safety: Principles and Practices, Brinton M. Miller et al., ASM, Wash., DC 1986;
AMSCO Equipment Manual on Laboratory Sterilizers.

2. Chlorine disinfection (detail in attachment)

Decontamination of:

- hoses
- filter housings
- pumps, apparatus
- heat-sensitive containers

Treat items by holding in chlorine solution overnight or by pumping solution through for 20 minutes (10-15 mg of chlorine per liter).

Disposal:

- none; items are washed and reused.

D. Health Unit Procedures for Handling of Biological Hazards

The United States Environmental Protection Agency (USEPA) has adopted the policy that all reasonable measures will be taken to protect employees, contractors, public, and the environment from adverse effects in carrying out its missions. The procedures described below are to be used in the Health Unit and present only a part of the entire Biological Safety Program. It is the policy of AWBERC that all biological wastes will be sterilized before they leave the building except when sewer disposal is appropriate and, whenever possible, the wastes or contaminated materials will be sterilized or securely contained before being transported from the area where the waste is first generated.

Because of the concern for AIDS, the following procedures for handling materials potentially contaminated with the AIDS virus will be followed. The procedures are based on a Center for Disease Control (CDC) report. The procedures are considered to provide adequate protection against two potentially *fatal* diseases *AIDS* and *Hepatitis B* virus. The procedures are based on the considerable amount of data available on Hepatitis B. Hepatitis B virus is known to exist in the same biological fluids and transmitted in the same way as the AIDS virus but is both harder and more infectious. Protective measures that are adequate to protect against Hepatitis B are therefore considered adequate protection against other viruses including the AIDS virus. The following procedures shall be followed whenever biological fluids or tissues are involved:

1. Latex gloves, eyeglasses, and long sleeves will be worn whenever there is a chance of contact with body fluids such as venipuncture, handling urine, and when pouring off serum.
2. All needles, syringes, and other materials which have come in contact with body fluids, i.e., lancets, sponges, Hemocult slides, spirometer tubes, speculums, tissues, proctoscopes, gloves, tongue depressors, applicators, glass tubes, thermometer sheaths, shall be placed in a burn box for incineration.

All (double) plastic bags will be securely closed with tape, placed in a cardboard box before transporting to the incin-

erator. The boxes will be labeled with the biological agent label.

3. Arrangements must be made with the Animal Facility Contractor (Ext. 7448) for acceptance and burning of the wastes. The burn boxes will be sealed in the Health Unit and hand-delivered by way of the freight elevator to the 7th floor incinerator room.
4. Biological materials will be handled only on impervious surfaces. Surfaces will be decontaminated after each use with a 10% sodium hypochlorite solution (bleach), or other suitable disinfectant.
5. The centrifuge is a potential source of contamination; it should be closed or covered during operation. For safe operation: (a) Use closed or screw-top containers; (b) When spills occur, clean surfaces and chambers with disinfectants.
6. Needles
 - a. Needles will not be bent or cut off to avoid aerosolization. Needles will not be recapped.
 - b. Needle holders will be soaked in a household bleach solution after use.
 - c. Needle containers will be incinerated.
7. AMBU or manual resuscitators will be used for CPR rather than mouth-to-mouth.
8. Gloves will be worn to test hemocult slides, then all discarded in burn box.
9. Spirometer hoses and adapters will be soaked in recommended Cidex solution for 15 minutes.
10. The double-glove procedure will be used to change a dressing.
11. Gloves will be used to empty the suction machine container. Metal suction machine wand will be soaked in Cidex after use.
12. Gloves will be worn for any eye contact followed by immediate hand washing after any contact.

Effective 6/90, Ohio infectious waste regulations apply:

1. Untreated infectious waste—to licensed incinerator*
2. Treated (autoclave - Room 388)—to sanitary landfill
3. Treated "sharps"—to sanitary landfill

Package and label properly for transporting personnel.

Environment, Safety and Health, OSORD (7969)
initiates shipping paper system with sanitary disposer

* Incinerator ash—sanitary or secure landfill.
Contact hazardous waste coordinator,
OSORD office (7969/7240).

Packaging, Decontamination & Disposal of Biological Agents

A. Steam Sterilization

Glassware
Small equipment

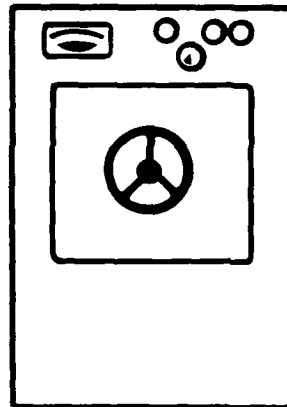


Prep Room

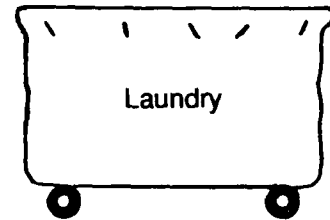
Towels
Labcoats



Steam autoclave

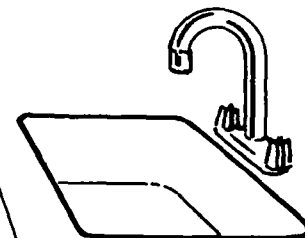


Autoclave 121°C for 30 min.
(See Tables)



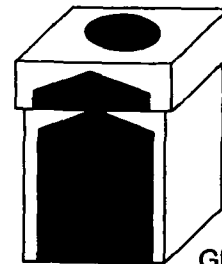
Laundry

Spent media
Sewage
Sludge



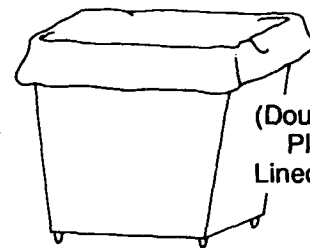
Sink/Sewer System

Broken/discard glass



Glass disposal box

Disposable plastic items
Filters
Paper
Cloth

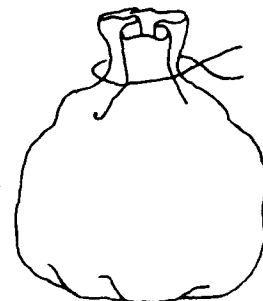


(Double, 50 mil.)
Plastic Bag
Lined Trash Can

Small or wet disposable items

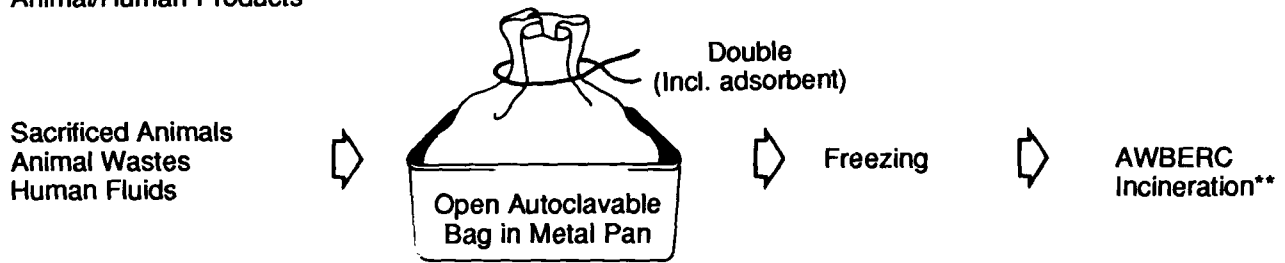


(Open Autoclavable
Bag in Metal Pan)

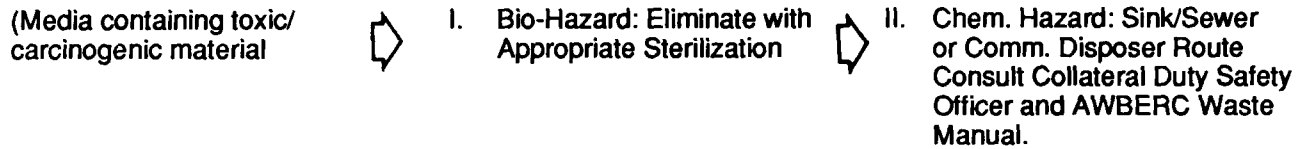


(Incl. adsorbent)
Trash Pick-up

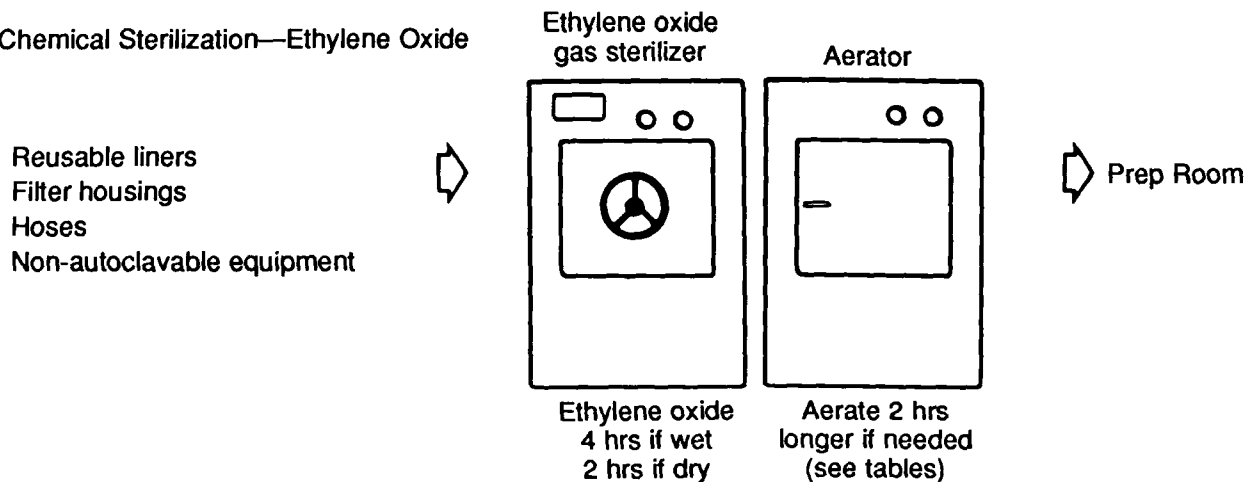
B. Animal/Human Products*



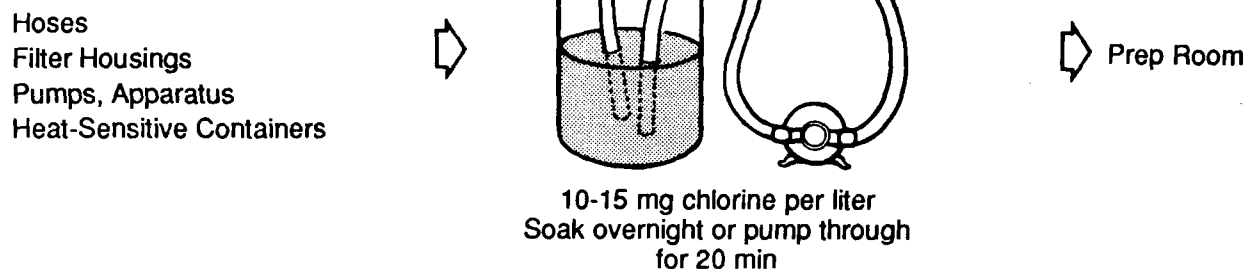
C. Mixed Bio/Chem Hazard:



D. Chemical Sterilization—Ethylene Oxide



E. Chemical Sterilization—Chlorine



* Those not sent to outside laboratory for analysis.

** Discuss with Animal Facility Contractor (Ext. 7448).

F. Detail Procedures

MINIMUM STERILIZATION EXPOSURE PERIODS

	121-123°C (250-254°F) Minutes
Brushes, in dispensers, in cans or individually wrapped	30
Dressings, wrapped in paper or muslin	30
Dressings, in canisters (on sides)	30
Glassware, empty, inverted	15
Instruments, metal only, any number (unwrapped)	15
Instruments, metal, combined with suture, tubing or other porous materials (unwrapped)	20
Instruments, metal only, in covered and/or padded tray	20
Instruments, metal, combined with other materials (in covered and/or padded tray)	30
Instruments, wrapped in double thickness muslin	30
Linen, packs (maximal size: 12 x 12 x 20"; maximal weight: 12 pounds)	30
Needles, individually packaged in glass tubes or paper (lumen moist)	30
Needles, unwrapped (lumen moist)	15
Rubber gloves, wrapped in muslin or paper	20
Rubber catheters, drains, tubing, etc. (lumen moist) unwrapped	20
Rubber catheters, drains, tubing, etc. individually packaged in muslin or paper (lumen moist)	30
Treatment trays, wrapped in muslin or paper	30
Utensils, unwrapped	15
Utensils, wrapped in muslin or paper	20
Syringes, unassembled, individually packaged in muslin or paper	30
Syringes, unassembled, unwrapped	15
Sutures, silk, cotton, or nylon, wrapped in paper or muslin	30

MINIMUM STERILIZATION EXPOSURE PERIODS
121-123°C (250-254°F)
Square-Pak Flasked Solutions

Flask Capacity (ml)	Time (Minutes)
75	20
250-500	25
1000	30
1500	35
2000	40
>2000	60

Centrifuging

Specimens containing blood should be centrifuged with the tubes tightly capped. If a tube breaks in the centrifuge, the bucket containing the spilled blood and broken glass should be placed carefully in a pan of disinfectant. The surfaces of the centrifuge head, bowl, trunions, and remaining buckets should be swabbed with an appropriate disinfectant; alternatively, the trunions and buckets can be autoclaved.

Microhematocrit centrifuges and bloodbank serofuges should be cleaned daily with a disinfectant. The top of the centrifuge should always be closed until the unit has come to a complete standstill.

Centrifuge tubes to be used in an angle-head centrifuge must never be filled to the point that liquid is in contact with the lip of the tube when it is placed in the rotor. When the tube lip becomes wet, liquid will be forced past the cap seal and over the outside of the tube.

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CHEMICAL WASTE MANAGEMENT GUIDELINES FOR AWBERC

Definition:

Solid and liquid chemicals and any materials contaminated with chemicals.

Examples:

- Chemical reagents no longer in use
- Outdated and excess chemicals
- Acids and bases
- Waste solvents
- Chemicals and contaminated materials resulting from spills
- Liquid media containing toxic/carcinogenic (Mixed Bio/Chem.)

The information highlighted here was extracted and summarized from *AWBERC Waste Disposal Manual*, (Rev. 1993). All laboratory personnel should be familiar with this material and participate in the training program for lab procedures and safety when offered.

There are only four ways that a hazardous chemical can leave the laboratory and AWBERC:

1. As a usable product (e.g., analytical standards)
2. Evaporation (with appropriate venting through hoods)*
3. Sink/sewer disposal (within EPA and MSD Guidelines)
4. Hazardous waste (via a commercial disposer)

* Deliberate evaporation for disposal purposes is prohibited by EPA policy.

These guidelines address routes 3 and 4.

- A. Summary of sink/sewer disposal guidelines that meet Metropolitan Sewer District (MSD) standards and EPA guidelines are attached.
- B. Major discussion is directed to solid "Hazardous Waste" disposal, and segregation in the laboratory.

General Instructions

1. In addition to basic chemical compatibility requirements, be aware that disposition of hazardous waste from AWBERC will be in three major streams:
 - a. *Incinerables*—(solvents and organics generally). If possible, keep aqueous and organic systems separate, and when possible, separate halogenated from nonhalogenated systems.
 - b. *Treatment Waste*—(acids and bases, and reactives such as ethers and peroxides).
 - c. *Landfill*—(inorganics, contaminated solids from spills, such as paper, rags, plastic ware and lab equipment/ supplies).

2. *Satellite Waste Storage:* When a container will be used as a collection vessel over time, it must carry the red "Hazardous Waste" label, with starting date and contents identification.
3. *Containerization:* All containers (bottles, boxes, cans) conveying waste must be appropriate to the task—sturdy, non-leaking, sealable. To avoid accidents when transferring to waste storage, use special carriers available from storeroom. Any package which could cause injury to a subsequent handler is not appropriate. Within AWBERC, use service elevator.
4. *Labelling:* In addition to the red "Hazardous Waste" label, each container must have the EPA-385 chemical waste tag (see attached exhibit for proper information). This triplicate form is brought to the waste storage site, where the waste officer assigns a log number and retains the white copy. The yellow copy is then affixed to the container, and the pink kept by the generator. "Characterization by analysis" or "...by knowledge" must appear on each Form 385. Examples of "Full Information" labels are attached. Accuracy is required as the signature of on-site supervisory personnel initiates the statutory "Chain-of-Custody" to ultimate disposition.

Special Notes:

1. PCBs and F020-28 listed compounds must be specifically identified at any level. OTHER ORGANIC CONTAMINANTS BELOW 1% NEED ONLY BE IDENTIFIED GENERICALLY; SAME FOR INORGANICS BELOW 100 ppm.
2. *Explosives*—(e.g., picric acid). Will require a Bomb Unit. The Safety Office must schedule the removal of any at-risk materials; notify by phone/memo.
3. Small gas cylinders must be expended prior to disposal in dumpster. For glass lecture bottles, see "Glassware Disposal."
4. See listing of "Chemicals With Disposal Problems" (attached). These materials, **at any concentration**, must be explicitly identified.

CHEMICAL WASTE MANAGEMENT: SINK/SEWER DISPOSAL

General: Chemicals Suitable for Sink Disposal at AWBERC

A basic principle of federal EPA policy frowns on the notion that "the solution to pollution is dilution." However, a more fundamental belief of human safety/survival is that there are gradations of quantity (absolute and relative) that make hazardous materials, dangerous in pure state, of reduced hazard in lower concentrations, and ultimately "safe" at some very low (or "threshold") concentration.

The guidelines set forth below take into account both of these principles, the nature of laboratory work, and the fact that the AWBERC facility enjoys a high dilution factor by its intrinsic water usage rate, prior to its discharge into the Metropolitan Sewer District's (MSD's) system. The restrictions which MSD imposes embody environmental concerns and human safety concerns inasmuch as it operates a treatment plant for processing drinking water to county residents. The guidelines also reflect the EPA's desire to be a good corporate citizen with respect to its own regulations, as well as to be an example of responsible behavior for

all citizens and other corporate units in society. For these reasons some chemicals are not acceptable in the sink/sewer system at any level. (See F,G, below).

Considering the more than 10,000 chemicals which are available in the AWBERC facility, these guidelines may appear to name only a limited number of potentially hazardous materials. However, any facility which enjoys an operational permit is required to meet high levels of professional responsibility; this is particularly incumbent on the professional personnel of the EPA's own facility. If you have any questions about interpretation of these guidelines, consult (1) the *Waste Manual* (Rev. 1993); (2) your Collateral Duty Safety Officer; and/or (3) the AWBERC Waste Coordinator (7240).

- A. The following table translates MSD's "point-of-discharge" (POD) threshold limits for key ions and chemical groups, into quantitative and concentration limits at an AWBERC sink.

Substance	AWBERC Sink (gm/minute)	Conc. Thres.* (%)	AWBERC Bldg. (lbs/day)
Cadmium	3.15	(.20)	10 lbs
Chromium (Total)	5.2	(.34)	16.6
Copper	5.2	(.34)	16.6
Cyanide	1.0	(.07)	3.3
(Amenable)			
Cyanide (Total)	5.2	(.34)	16.6
Mercury	.01	(.7x10 ⁻³)	15.gms
Nickel	5.2	(.34)	16.6 lbs
Lead	3.15	(.20)	10.0
Zinc	5.2	(.34)	16.6lbs
Pesticides/PBCs	.026	(1.7x10 ⁻³)	37.5 gms
(in carrier)			
Phenol	1.7	(.10)	5.4 lbs
TOH**	1.7	(.10)	5.4 lbs
Oils & Grease	17.0	(1.0)	54.0 lbs

* See B for assumptions underlying these thresholds

** TOH = Total Organic Halides

- B. To assure a safety factor between AWBERC sink and MSD's POD of about 10-fold, it is assumed that no single lab is discharging more than 1500 ml per min, or 15 labs discharging the same material simultaneously at more than 100 ml/min. The column marked "conc. thres." (concentration threshold) converts absolute quantity levels of gms per minute into % concentration limits for liquid discharge, using AWBERC's daily water volume usage rate.

- C. Solvents of low water miscibility, but high volatility (i.e., high Henry's Law constants), when pure or exhibiting a distinct phase, like methylene chloride and benzene/toluene/xylene, should not be sink-discharged. When solubilized in another vehicle, the threshold and quantity limits in A and B apply. For larger quantities, call the Waste Coordinator. For more than liter quantities, convey to the Waste Storage Facility. (Ref. Table 3 below).

- D. Provides sufficient flushing so that (a) all materials are conveyed to the main discharge lines as expeditiously as possible and (b) only water resides in the "J" or drum traps to prevent reverse passage of sewer gases.
- E. Pesticides and PCBs are restricted to levels of 10 ppm or lower, in aqueous vehicles.
- F. No dioxins or dibenzofurans at any level—**zero!**
- G. No biotoxins or malodorous materials (like mercaptans, some amines)—**zero!**
- H. Acids and bases may be discharged after neutralization to MSD's pH limits, 6-10. (See procedures below).
- I. When sink discharge is not appropriate, consign to a proper Satellite Storage vessel for ultimate transfer to the Waste Storage Facility.

Procedures for Acid-Base Neutralization

A. Acid Neutralization

Add the acid to a large volume of an ice-water solution of sodium carbonate (soda ash), slaked lime or 6M sodium hydroxide (for concentrated acids). When the pH is above 5.0, dispose of the solution into the sewer system with substantial flushing. If more than a few gallons are involved, the pH should be closer to 7.

B. Base Neutralization

Begin by adding the base to a large vessel containing water so that the concentration is less than 6M. Slowly add a 1M solution of HCL until the pH reaches 10.0 or less. Dispose of the neutralized mixture with substantial flushing.

PERTINENT MSD REGULATIONS

Section 1515

No person shall discharge wastes from garbage grinders into the wastewater treatment system except

- a. Wastes generated in preparation of food normally consumed on the premises, or
- b. Wastes of a specific character whose discharge after grinding is authorized by a written permit signed by the Director.

All garbage grinders shall shred the waste to a degree that all particles will be carried freely under normal flow conditions prevailing in the public sewer. Wastes from garbage grinders used for grinding plastic, paper products, inert materials, or garden refuse shall NOT be discharged into the wastewater treatment system.

Section 1516

No person shall discharge any substances directly into a manhole or other opening in the wastewater treatment system other than through an approved building sewer, unless upon written application to the Director and payment of the applicable user charges and fees. The Director issues a permit for such direct discharges.

Section 1517 - (Revised - 1991)

No person shall discharge wastewater containing cadmium, chromium, copper, cyanide (amenable), cyanide (total), mercury, nickel, lead, or zinc in concentrations greater than those listed in Table 1517-1, wherein concentrations in Column (A) are those of composite samples collected over the daily period of operation in proportion to flow so as to produce a representative sample, and concentrations in Column (B) are those of samples collected over a time interval of not more than one minute so as to produce a grab sample. However, if Q, the daily discharge of a user in gallons per day, is less than 24,000, the allowable concentration of any substance listed in Table 1517-1 except Cyanide (amenable) and Mercury shall be calculated by multiplying the value listed in Table 1517-1 by 24,000/Q, but in no event shall an allowable concentration exceed three times the listed value.

Table 1517-1. Effluent Limitations (Includes Mill Creek Local Limits)

Substance	Concentration, mg/L	
	(Avg.) Column (A)	(one-time grab sample) Column (B)
Cadmium (Total)	6	9
Chromium (Total)	10	15
Copper (Total)	10	15
Cyanide (Amenable)	—	3
Cyanide (Total)	—	15
Mercury (Total)	0.02	0.03
Nickel (Total)	10	15
Lead (Total)	6	9
Zinc (Total)	10	15
Pesticides/PCBs	.05	.07
Phenols	—	50
Oil and Grease	—	50
Total Organic Halides	5	7.5
Vapor Space Organics	—	450 ppm
pH	6-10	—

CHEMICAL WASTE MANAGEMENT: PROBLEM CHEMICALS

Chemicals With Disposal Problems

Some disposers are able to accept some of these materials on a CASE-BY-CASE basis, but special arrangements must be made ahead of time, so consult the *Safety Office* for a current approved disposer. In addition to MSD sheets, consult the Technical Sales Representative or the Regional Sales Manager of your supplier for details of disposition. Since commercial disposal is doubtful when not impossible, be prepared to retain indefinitely.

- A. Explosives (as defined by the Bureau of Alcohol, Tobacco, and Firearms)
 - 1. Organic peroxides
 - 2. Picric Acid (except when used in biological stain)
 - 3. Di and trinitrated compounds
- B. Compressed gases/aerosol cans
- C. Dioxins and dioxin-related compounds, like pentachlorophenol
- D. Toxic (pesticides, herbicides, etc.)
 - 1. Kepone
 - 2. Mirex (fire ant poison)
 - 3. Hexachlorocyclopentadiene (C-56)
 - 4. 2,4,5-Trichlorophenoxyacetic Acid (2,4,5 T-DOW)
 - 5. 2,4,5-Trichlorophenoxypropionic Acid (2,4,5 TP)(Silvex)
- E. Pyrophoric Liquids (e.g., Titanium dichloride, phosphorous, sodium, lithium hydride, etc.
- F. At-risk peroxides or precursors
 - 1. Strontium peroxide
 - 2. Isopropyl ether

CHEMICAL WASTE MANAGEMENT: SEGREGATION

Segregation* of Laboratory Chemicals for Disposal and Storage

- 1. Corrosive Materials
 - a. Acids from bases
 - b. Organic acids from inorganic acids
 - c. Materials which should be separated from all others
 - i. Bromine
 - ii. Hypochlorite
 - iii. "Corrosive keep dry" materials
- 2. Flammable Liquids
 - a. Flammable and combustible liquids can be placed together
 - b. Ethers should be packaged alone when possible
 - c. Tetrahydrofuran and Dioxane if greater than 50% must be treated as reactives; if under 50%, treat as combustibles.
- 3. Oxidizers
 - a. Separate organic oxidizers from inorganic oxidizers
 - b. Separate weak oxidizers from strong oxidizers

* Segregation means a physical distance, and a barrier if possible.

4. Poisons. Most poisons can be packaged together with the exception of
 - a. TDI/MDI wastes*
 - b. Cyanides
 - c. SulfidesORM-As, ORM-Cs, ORM-Es,* can be separated with poisons.
Highly toxic materials such as dioxins, etc., are unacceptable.
5. Flammable Solids. Flammable solids may be placed only with other flammable solids. "Dangerous when wet" compounds are reactives and must be handled as such.
6. Reactive Materials. Keep away from water and don't overpack together. Reactive classes include
 - a. Corrosives such as acetyl bromide, oxychloride, phosphorous trichloride
 - b. Flammable solids such as carbides, hydrides, and pure metal dusts like zinc, calcium, potassium, etc.
 - c. Oxidizers. Peroxides
 - d. Flammable solids (air reactive). Phosphorous.
 - e. Flammable liquids such as ethers, dioxane, dispersions of reactive materials
7. Separate **acutely** hazardous (P-Listed and F020-F028) wastes from "Plain" hazardous. **Acutely** hazardous may be accumulated up to **one quart**, and "Plain" hazardous to **55 gallons**; mixtures must be treated as acutely hazardous. When **full**, there are **3 days** to move them to Central Waste Storage.

* Toluene diisocyanates (TDI), methylene bisphenyl isocyanate (MDI); Other Regulated Materials (ORM)... See 49 CFR 175.605 ff

Table 3. RCRA Waste Categorization Based on Aqueous Volatility (Henry's Constant)

Waste Name	Henry's Constant (atm-m ³ /mole)	Waste Code
Highly Volatile Wastes- Values of H above 10 ⁻³		
Bis(2-ethyl hexyl phthalate)	26.6	U028
Cyanogen	9.91	P031
Reserpine	4.28	U200
Dichlorodifluoromethane	2.75	U075
Chloromethane	0.38	U045
Chloroethene	0.199	U043
Phosphine	0.19	P096
Cyclohexane	0.18	U056
2-Nitropropane	0.12	U171
Bromomethane	0.106	U029
Trichloromonofluoromethane	5.8x10 ⁻²	U121
2,3,4,6-Tetrachlorophenol	4.5x10 ⁻²	U212
1,3-Pentadiene	4.2x10 ⁻²	U186
Pentachloronitrobenzene	2.9x10 ⁻²	U185
Tetrachloroethylene	2.87x10 ⁻²	U210
Hexachloropropene	2.5x10 ⁻²	U243
Tetrachloromethane	2.13x10 ⁻²	U211
Hexachlorocyclopentadiene	1.60x10 ⁻²	U130
1,1-Dichloroethylene	1.50x10 ⁻²	U078
Cumene	1.40x10 ⁻²	U055
DDD	1.26x10 ⁻²	U060
Carbon disulfide	1.2x10 ⁻²	P022
Mercury	1.14x10 ⁻²	D009
Hexachloroethane	9.85x10 ⁻³	U131
Hexachlorobutadiene	9.14x10 ⁻³	U128
Trichloroethylene	8.92x10 ⁻³	U228
3-Methylcholanthrene	7.7x10 ⁻³	U157
1,2-Dichloroethylene (CIS)	6.6x10 ⁻³	U079
Toluene	6.64x10 ⁻³	U220
Furan	5.7x10 ⁻³	U124
Benzene	5.55x10 ⁻³	U019
1,1-Dichloroethane	5.45x10 ⁻³	U076
1,2-Dichloroethylene (trans)	5.32x10 ⁻³	U079
o-Xylene	5.27x10 ⁻³	U239
Methyl iodide	5.0x10 ⁻³	U138
1,1,1-Trichloroethane	4.92x10 ⁻³	U226
Toxaphene	4.89x10 ⁻³	U224
1,3-Dichloropropane	4.2x10 ⁻³	U084
Methanethiol	4.0x10 ⁻³	U153
Chlorobenzene	3.93x10 ⁻³	U037
Chloroform	3.93x10 ⁻³	U044
Cyanogen chloride	3.2x10 ⁻³	P033
Methylene chloride	3.19x10 ⁻³	U080
1,2-Dichloropropane	2.8x10 ⁻³	U083
1,1,1,2-Tetrachloroethane	2.76x10 ⁻³	U208
4-Bromopropylphenylether	2.74x10 ⁻³	U030
m-Dichlorobenzene	2.63x10 ⁻³	U071
m-Xylene	2.55x10 ⁻³	U239
p-Xylene	2.51x10 ⁻³	U239

(continued)

Table 3. (continued)

Waste Name	Henry's Constant (atm-m ³ /mole)	Waste Code
Highly Volatile Wastes- Values of H above 10 ⁻³		
Hexachlorohexahydro-exo, exo-dimethanonaphthalene	2.49x10 ⁻³	P060
p-Dichlorobenzene	2.37x10 ⁻³	U072
Pentachloroethane	2.17x10 ⁻³	U184
Octachlorocamphene	2.01x10 ⁻³	P123
o-Dichlorobenzene	1.94x10 ⁻³	U070
Dimethylcarbamoylchloride	1.8x10 ⁻³	P097
Hexachlorobenzene	1.7x10 ⁻³	U127
Heptachlor	1.48x10 ⁻³	P059
Pentachlorobenzene	1.3x10 ⁻³	U183
1,1,2-Trichloroethane	1.8x10 ⁻³	U227
1,2-Dichloroethane	1.10x10 ⁻³	U077

GLOSSARY OF ABBREVIATIONS AND SELECTED TERMS

ACS	American Chemical Society
CCBW	Chemically contaminated biological waste
CRF	Code of Federal Regulations
DOT	U.S. Department of Transportation
EPA	U.S. Environmental Protection Agency
FR	<i>Federal Register</i>
Lab pack	See Chapter 10, Section V.B, for general description; see Appendix A, 40 CFR 265.316
LC ₅₀	A concentration in air that is lethal to 50% of a group of test animals
LD ₅₀	A dose ingested, injected, or applied to the skin that is lethal to 50% of a group of test animals
NRC	National Research Council, the operating arm of the National Academy of Sciences and the National Academy of Engineering
n.o.s.	Not otherwise specified (often used in DOT classifications and regulations)
ORM-A	Other Regulated Material; see Appendix D, 49 CFR 173.500 (b)(1)
ORM-B	Other Regulated Material; see Appendix D, 49 CFR 173.500 (b)(2)
ORM-E	Other Regulated Material; see Appendix D, 49 CFR 173.500 (b)(5)
PCB	Polychlorinated biphenyl; EPA interprets this to include the monochlorobiphenyls
POHC	Principal Organic Hazardous Constituent: an organic chemical that is a constituent that is to be burned in an incinerator and that has been identified by EPA in Appendix VIII of 40 CFR Part 261
Poison A	See Appendix D, 49 CFR 173.326
Poison B	See Appendix D, 49 CFR 173.343
POTW	Publicly Owned Treatment Works; designates a municipal wastewater treatment plant
RCRA	Resource Conservation and Recovery Act
Secure landfill	A landfill that is authorized by EPA or a state to receive hazardous waste
WWTP	Wastewater treatment plant

EPA-385(CIN)
(3/86)

CHEMICAL WASTE DISPOSAL FORM

Characterized by knowledge

Instructions on Reverse Side

THIS FORM MUST BE TYPED - DATED - SIGNED

CONTAINER #	METHOD
712	<input type="checkbox"/> INCINERATOR <input type="checkbox"/> LANDFILL
WAREHOUSE USE ONLY	

Chemical Identity of Waste (NO ABBREVIATIONS OR TRADE NAMES)		Quantity	FOR OFFICIAL USE ONLY	
			Dot Hazard Classification	EPA Hazardous Waste No.
Hexane		~2 liter		
Toluene		~1.5 liter		
Water		~1.2 liter		
Traces of DDT, Hexachlorobenzene and it's Daughter compounds				

CERTIFICATION

This is to certify the above information is correct and may be used for further chemical waste management required for packing, packaging, marking, labeling and shipping documents to be prepared in accordance with DOT regulations.

Gregory Saylor

SIGNATURE (Please Press Firmly)

DATE

ORG & ROOM #

6/22/93 RREL 417

EPA-385(CIN)
(3/86)

CONTENTS BY KNOWLEDGE

CHEMICAL WASTE DISPOSAL FORM

Instructions on Reverse Side

THIS FORM MUST BE TYPED - DATED - SIGNED

CONTAINER #	METHOD
699	<input type="checkbox"/> INCINERATOR <input type="checkbox"/> LANDFILL
WAREHOUSE USE ONLY	

Chemical Identity of Waste (NO ABBREVIATIONS OR TRADE NAMES)		Quantity	FOR OFFICIAL USE ONLY	
			Dot Hazard Classification	EPA Hazardous Waste No.
propanol, pentane, methylene chloride, methyl t-butyl ether, hexane, chlorinated and brominated				
pesticides and herbicides; conc 1 mg/L		1	gal	

CERTIFICATION

This is to certify the above information is correct and may be used for further chemical waste management required for packing, packaging, marking, labeling and shipping documents to be prepared in accordance with DOT regulations.

Charles Feldmann

SIGNATURE (Please Press Firmly)

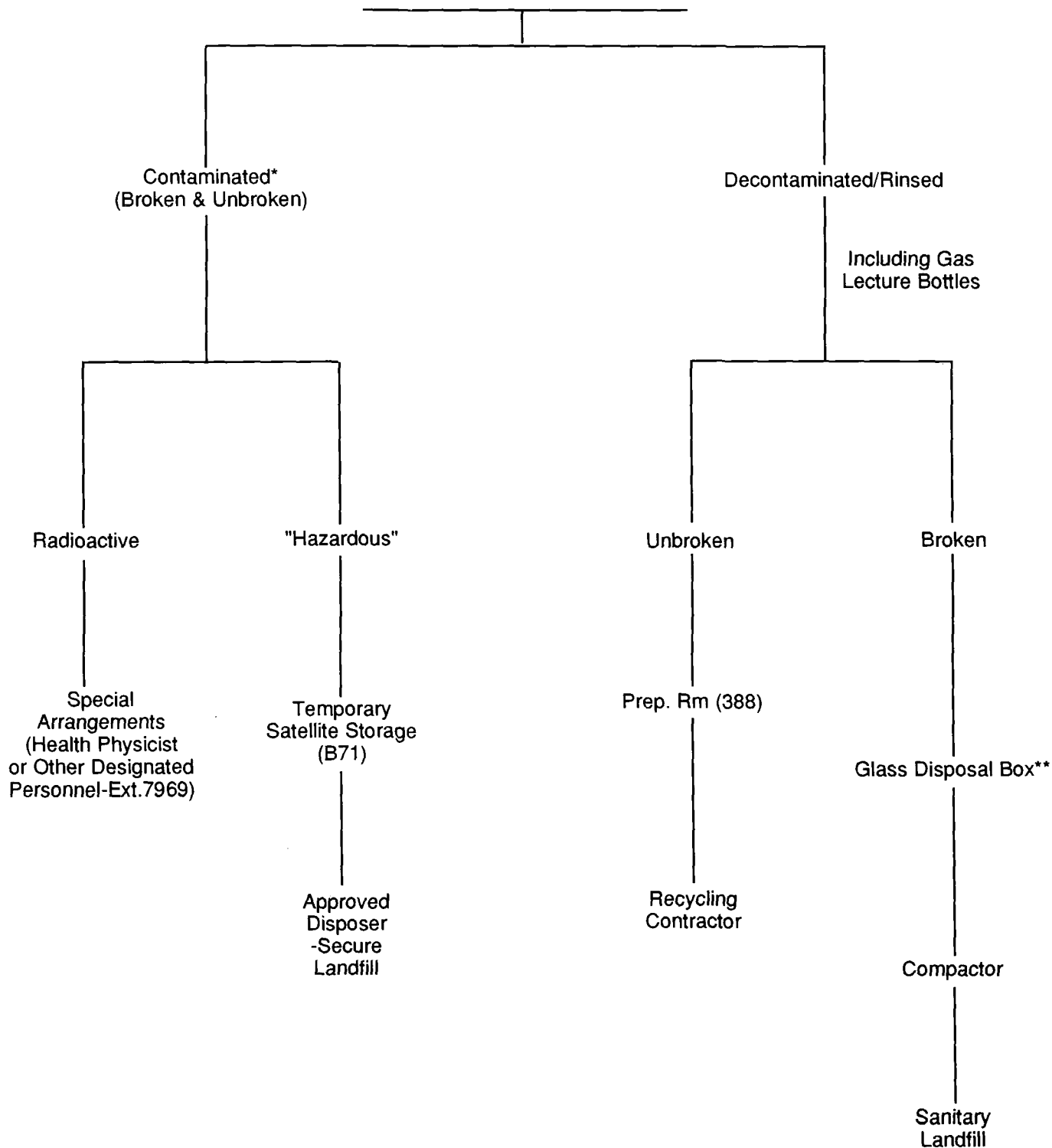
DATE

TSD 144

ORG & ROOM #

5/13/93

AWBERC GLASSWARE DISPOSAL



*Residual Quantities of
Hazardous Chemicals

**Pick-up initiated by phone call to
Trouble Desk (Ext. 7521)