


Universal Waste & Transit, Inc.

Operation Permit Application

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Volume 4


ATTACHMENT "D" - APPLICATION
ATTACHMENT VOLUME 4

- Training Program

TRAINING PROGRAM
for
Universal Waste & Transit
Orient Road
Tampa, Florida

TRAINING PROGRAM

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CHAPTER ONE

INTRODUCTION

prepared by

Universal Waste & Transit

Orient Road

Tampa Florida

Introduction

STORAGE/TREATMENT PERSONNEL TRAINING PROGRAM

All personnel involved in any handling, transportation, storage or treatment of hazardous wastes are required to start the enclosed training program within one-week after the initiation of employment at Universal Waste & Transit. This training program includes the following:

- Safety Equipment
- Personnel Protective Equipment
- First Aid & CPR
- Waste Handling Procedures
- Release Prevention & Response
- Decontamination Procedures
- Facility Operations
- Facility Maintenance
- Transportation Requirements
- Recordkeeping

We highly recommend that all personnel involved in the handling, transportation, storage or treatment of hazardous wastes actively pursue additional technical courses at either the University of South Florida, or Tampa Junior College. Recommended courses would include general chemistry; analytical chemistry; environmental chemistry; toxicology; and additional safety and health related topics. Universal Waste & Transit will pay all registration, tuition and book fees for any courses which are job related. The only requirement is the successful completion of that course.

Training and related items are handled by the Universal Waste & Transit training officer, Mr. Paul Sgriccia, P. E.

Pre-Employment Screening

All potential employees at Universal Waste & Transit are carefully screened prior to hiring. This includes:

- in depth interviews
- academic and experience requirements
- medical evaluation

All potential employees are informed that they will working with hazardous or potentially hazardous materials. All potential employees will visit the facility to determine "first hand" what the working environment entails. All potential employees are informed that any safety violation or improper handling of waste materials/containers will result in immediate dismissal.

A list of job related prerequisites is indicated in Table 1.

TYPES OF TRAINING

Four types of training are employed at Universal Waste & Transit.

These are

1. A formal training course for all new employees which encompasses the areas previously mentioned. This course is culminated by an examination at the end of the course. A review of all formalized courses is performed annually.
2. An informal weekly safety meeting during which time new safety apparatus are discussed or training films/slide presentations are viewed. Alternative to this are discussions on waste handling procedures; site cleanup work; emergency response etc.
- 3 Attendance at commercially available safety or preparedness classes. Examples include: J.T. Baker's "Management and Disposal of Hazardous Chemical Wastes" or Safety Systems Inc. "Disaster Control School". These are both available within the State of Florida. All supervisory personnel must attend these schools, or similar classes.
4. An ongoing on-the-job training program which assists new employees in familiarizing themselves with the existing working conditions and company policy. Also available to all employees is a well equipped technical library.

If an employee is not kept well informed of the company's activities he quickly loses interest and pride in his/her work. In the area of hazardous waste management this situation cannot be tolerated. Therefore, it is also company policy at Universal Waste & Transit to have a weekly meeting to discuss what work is in progress; what new jobs are anticipated and to determine what questions or recommendations employees may have to operate more efficiently or safely.

TRAINING PROGRAMS

Contained within are training documents which are used in conjunction with the formal training program. All new employees are given copies of the following:

- General Safety Manual
- Protective Clothing Guide
- Respiratory Training Program
- Basic Emergency Training Guide
- Facility Contingency Plan
- Pocket Guide to Hazardous Materials
- NIOSH Worker Safety Bulletin for Hazardous Waste Sites

Each document is reviewed with the employee by the Universal Waste & Transit safety officer.

All pertinent safety equipment usage is discussed. This includes: respirators; SCBA; acid suits; encapsulation suits; fire extinguishers & hose; evacuation horns and material handling equipment.

Each employee is assigned their own respirator and fit tested as required. Cleaning and maintenance of the respirator is explained.

The locations and usage of all safety and emergency response equipment is detailed.

All new employees are immediately informed as to the procedures involved in any spill or release at the facility. This includes:

- employee warning signals
- agencies to contact
- evacuation routes
- response actions

Finally each new employee is shown how drums are inspected; opened; sampled; sealed; labeled; moved; and the recordkeeping requirements. Upon completion of the training program both an oral and written examination are required. An annual review of all training programs is performed.

Appended to this are each of the training documents previously described.

TABLE I

Universal Waste & Transit

Job Description Prerequisites

Title

Facility Manager

Masters degree in physical science and two years experience in waste management or four years experience in waste management with bachelors degree in lieu of masters degree.

Traffic Manager

Bachelors degree in physical science; engineering.

Facility Chemist

Bachelors degree in chemistry with two years experience in the waste management area.

Hazardous Waste Technician

Bachelors degree or associate degree in environmental technology and one year experience in waste management field or three years experience in lieu of degree.

Emergency Response Crew

Same as above a minimum.

Site Cleanup Supervisor

Bachelors degree preferred, associate degree accepted with construction background.

Analytical Technician

Associates degree in environmental technology or related discipline.

Waste Handling Technician

Associates degree preferred, high school diploma required with in-house training mandatory.

CHAPTER TWO

Training Manual No. 1

GENERAL SAFETY MANUAL

prepared by

Universal Waste & Transit

Orient Road

Tampa Florida

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Ways You Can Be Exposed To Waste Hazards

How To Protect Yourself Against These Hazards

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Atmosphere Supplying Respirators

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Contamination/Decontamination

Emergency Information

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CHAPTER THREE

Training Manual No. 2

PROTECTIVE CLOTHING GUIDE

prepared by
Universal Waste & Transit
Orient Road
Tampa, Florida

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Selected Chemical Hazards

Dress For The Occasion

In order to determine what protective equipment is required for a certain situation you must ask yourself or your supervisor a number of questions. These are:

1. What are the specific job hazards?
2. Is the contaminant a dust, mist, fume, vapor, gas, liquid or solid?
3. Is the situation classified as immediately dangerous to life and health (IDLH)?
4. Is the need for flame-retardant equipment necessary?
5. Is the atmosphere oxygen deficient?
6. Is the material readily absorbed through the skin or does it irritate the eyes, nose or throat?
7. Will the exposure be casual or direct?
8. Will the exposure be short-term or prolonged?
9. Is temperature or climatic conditions a consideration?
10. Will sufficient back-up personnel be available to assist me in an emergency situation?

Answers to all of these items are necessary before an educated decision as to the amount and type of personnel protective equipment required can be made. Remember, there are only three routes by which you can be exposed to potential hazards:

☛ Inhalation

Ingestion

Skin Contact

Be sure you take the necessary steps to reduce your potential exposure. The protective clothing required, as with respirators, varies dependent upon the immediate situation. (See Attachment 1)

Protective clothing consists of suits; gloves; boots, eye/face protection; gauntlets; and so on. There are presently many types, designs and styles of these items and the choice must be based upon the materials which you anticipate encountering. (See Attachment 2)

Protective Suits

Protective suits fall into four general categories:

Splash suits - disposable

Splash suits - reusable

Proximity suits - fire

Proximity suits - chemical

Splash Suits

Splash suits are employed in situations not immediately dangerous to life and health. These suits generally consist of coated cotton or paper (disposable) or chemically resistant polyvinyl chloride (PVC) which is reusable. The disposable suits are effective when working in areas of low level contamination or in areas which may require only minimum protective equipment. PVC suits provide adequate protection for many acids; alkalis; oils; and alcohols but afford only minimal protection in areas immediately dangerous to life and health. Both the disposable and reusable suits can cause substantial heat stress in warm environments.

Proximity Suits

Proximity suits are full-body suits which provide high levels of worker protection. The fire fighting proximity suit is generally manufactured of aluminized nomex or aluminized rayon and provide up to 90% reflectivity of radiant heat. The chemical proximity suits are generally manufactured of PVC; coated PVC, or synthetic or rubber compounds. Once again, certain solvents can attack these materials and shorten their useful life expectancy.

Proximity suits are generally used in conjunction with either air line respirators or self contained breathing apparatus. Many are equipped with air conditioning type systems which reduce the heat stress associated with splash suits. All proximity suits are designed to cover the worker from head to toe in a fully encapsulated environment. Your ease of mobility is substantially restricted when using a proximity suit, especially one which is employing an air-line respirator. You should be fully familiar with the use and operation of a proximity suit before use. Workers have experienced claustrophobia when confined in a proximity suit and you should be aware of your limitations in this area. You should regularly practice various tasks in these suits to determine your limitations.

Hand Protection

In order to protect your hands, wrists and forearms, gloves are required which meet the demand of your work situation. If splash suits are employed, suitable gloves must be chosen depending upon the material which is to be handled. Chemically resistant gloves are manufactured generally of the following materials:

- Polyvinyl chloride (PVC)
- Neoprene
- Natural rubber
- Polyvinyl alcohol
- Nitrile

The choice of glove material is highly dependent upon the items which will be encountered. Table 1 lists various glove material and their resistance to a number of chemical compounds.

Some proximity suits are already equipped with gloves attached. Determine what these gloves are manufactured from and if they are suitable for your particular situation. If they are not, place a second pair of gloves of suitable material, over them. This, once again, reduces your work efficiency, but also insures that you are adequately protected.

With proximity suits, the glove/sleeve interface is bonded together either physically or chemically so as to insure a sealed system. With splash suits, however, this is not the case. The potential exists at both the glove and sleeve interface, as well as the boot and pant leg interface for the entrance of contaminants. An easy method to reduce this potential exposure, is to place the sleeves over the gloves and the pants leg over the boot, and then taping both areas with duct tape. This provides much better exposure protection, but significantly reduces the ability of your body to cool itself: Be aware that heat stress may result.

Eye/Face Protection

Anytime you are working in a hazardous environment, eye protection is a necessity. The eyes are the easiest organ to injure and the hardest to repair. Eye protection can come in the form of safety glasses with side panels; goggles, or face shields. These eye protection systems are generally manufactured of either polycarbonate or polyethylene, many of which are now manufactured with a non-fogging coating. Safety glasses and goggles should only be worn in areas of very low potential hazard, since a majority of the face is still unprotected. Face shields, or full-face respirators, provide significantly more facial protection. However, never enter the hazardous waste area without some form of eye protection. Contact lenses are not acceptable in the work environment. Specialized goggles which can accept corrective lenses are available.

Questions To Ask Yourself

In summarizing the choice of protective clothing, the following questions must be answered:

1. Is the situation immediately dangerous to life and health? - If so, proximity suits are required.
2. Is there a high potential for fire? - if so, fire resistant or flame retardant clothing is required.
3. What chemicals am I likely to encounter? - assess the situation and decide upon suitable materials for gloves, boots, and protective clothing.
4. What are the climatic conditions? - heat requires cooling; liquids and shortened work cycles; while cold conditions require additional clothing.
5. Is high visibility required? - brightly colored or fluorescent clothing should be used.
6. Remember, always wear eye protection and cover as much of your body as possible.

Attachment 1

PERSONNEL PROTECTIVE EQUIPMENT REQUIRED
FOR HAZARDOUS SITUATIONS

Level A Protection

HAZARD INVOLVED

- Situations immediately dangerous to life and health.
- Oxygen deficient atmospheres.
- Unknown hazardous materials.
- Chemicals which can be absorbed through the skin.
- Materials which cannot be removed with an air purifying respirator.

REQUIRED PERSONNEL PROTECTION EQUIPMENT

- Self-contained breathing apparatus (SCBA) or air line respirator with SCBA escape air system.
- Full Body Encapsulation Suit

ALL listed personal protective equipment is required for any hazard situation indicated.

PERSONNEL PROTECTIVE EQUIPMENT REQUIRED
FOR HAZARDOUS SITUATIONS

Level B Protection

HAZARD INVOLVED

- Oxygen deficient atmosphere where chemical composition of the material is known and falls into the classification of an irritant.

REQUIRED PERSONNEL PROTECTION EQUIPMENT

- Self contained breathing apparatus or air line respirator with SCBA for emergency use.
- PVC splash suit with hood.
- Neoprene/nitrile/butyl rubber arm length gloves.
- Steel toed rubber boots.

All listed personal protective equipment is required for any hazard situation indicated.

PERSONNEL PROTECTIVE EQUIPMENT REQUIRED
FOR HAZARDOUS SITUATIONS

Level C Protection

HAZARD INVOLVED

- Situations not immediately dangerous to life and health.
- Sufficient oxygen present to support life.
- Irritant or corrosive chemicals.
- Contaminated soils.
- Liquid/solvents not immediately dangerous to life and health.

REQUIRED PERSONNEL PROTECTION EQUIPMENT

- Full face mask with air purifying (cartridge) respirator. Or, half face (cartridge) respirator with goggles and face shield.
- PVC splash suit.
- Protective gloves (type dependent on chemical being handled).
- Steel toed rubber boots.

All listed personnel protective equipment is required for any hazard situation indicated.

PERSONNEL PROTECTIVE EQUIPMENT REQUIRED
FOR HAZARDOUS SITUATIONS

Level D Protection

HAZARD INVOLVED

- Situations which contain no immediate hazard, but where there is the potential for accidental release of a hazardous substance.

REQUIRED PERSONNEL PROTECTION EQUIPMENT

- Half face air purifying (cartridge) respirator.
- Safety goggles.
- Disposable coveralls.
- Surgical rubber gloves or suitable hand protection.
- Rubber boots.

All listed personnel protective equipment is required for any hazard situation indicated.

E-Excellent
G-Good
F-Fair
P-Poor

PROTECTIVE CLOTHING COMPATABILITY
WITH SELECTED CHEMICAL HAZARDS

<u>Chemical Hazard</u>	<u>Natural Rubber</u>	<u>Neoprene</u>	<u>Polyvinyl Alcohol</u>	<u>Polyvinyl Chloride</u>	<u>Nitrile</u>
Acetaldehyde	G	G	P	F	F
Acetic Acid	E	E	F	G	E
Acetic Anhydride	G	G	P	F	G
Acetonitrile	G	G	G	G	G
Acetone	E	G	F	P	P
Acrylonitrile	F	G	F	F	F
Alcohols	G	F	P	F	E
Ammonia(100%)	G	G	P	E	-
Amyl Acetate	F	G	G	P	G
Aniline	F	G	F	G	P
Battery Acid	G	E	P	E	E
Benzaldehyde	F	P	E	P	P
Benzene	P	P	E	P	P
Benzene Sulfinic	P	G	P	E	-
Bromine	G	G	E	G	G
Butyric Acid	F	G	F	G	-
Cadmium Cyanide	G	E	G	E	G
Carbolic Acid	F	E	F	E	E
Carbon Tetrachloride	P	P	E	G	P
Chlorine	F	F	E	G	G
Chloroform	P	P	E	P	P
Chlorosulfonic Acid	P	P	F	G	F
Chromic Acid	P	F	P	G	P
Cresol	G	G	F	F	P
Cyanide Solution	G	G	P	F	G
Cyclohexane	P	G	E	P	P
Diethyl Phthalate	F	G	E	P	P

E-Excellent
G-Good
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PROTECTIVE CLOTHING COMPATABILITY
WITH SELECTED CHEMICAL HAZARDS

<u>Chemical Hazard</u>	<u>Natural Rubber</u>	<u>Neoprene</u>	<u>Polyvinyl Alcohol</u>	<u>Polyvinyl Chloride</u>	<u>Nitrile</u>
Dimethyl Formamide	E	G	P	P	P
Dioxane	F	F	P	P	P
Ethanolamine	F	G	P	E	P
Ethers	G	E	E	P	P
Ethyl Acetate	F	G	F	P	P
Ethyl Alcohol	E	E	P	G	E
Ethylene Dichloride	P	P	E	P	P
Ethylene Glycol	E	E	G	E	E
Formaldehyde	E	E	P	E	E
Formic Acid	G	E	P	E	F
Frem	P	F	E	P	F
el Oil	P	G	E	G	P
Furfural	G	G	F	F	P
Gasoline (unleaded)	P	P	F	P	E
Hexane	P	G	E	P	E
Hydrobromic Acid (40%)	G	E	P	E	E
Hydrochloric Acid (Conc.)	G	E	P	E	E
Hydrofluoric Acid (30%)	G	E	P	G	E
Hydrogen Peroxide (30%)	G	E	P	E	E
Isopropyl Alcohol	E	E	P	E	E
Kerosene	P	E	E	G	E
Mercury	G	G	P	E	E
Methyl Alcohol	E	E	P	G	E
Methylene Chloride	P	P	G	P	P
Methyl Isobutyl Ketone	F	P	F	P	P
Methyl Methacrylate	P	P	G	P	P
Naphtha	P	P	E	F	E

E-Excellent
G-Good
F-Fair
P-Poor

PROTECTIVE CLOTHING COMPATABILITY
WITH SELECTED CHEMICAL HAZARDS

<u>Chemical Hazard</u>	<u>Natural Rubber</u>	<u>Neoprene</u>	<u>Polyvinyl Alcohol</u>	<u>Polyvinyl Chloride</u>	<u>Nitrile</u>
Nitric Acid (10%)	P	P	P	G	E
Nitric Acid (70%)	P	G	P	P	P
Nitric Acid (Fuming)	P	P	P	P	P
Nitrobenzene	P	P	E	P	P
Nitromethane	F	G	E	P	P
Oleum	P	P	P	F	P
Parathion	P	P	G	F	P
Pentane	P	E	E	P	E
Perchloroethylene	P	F	E	F	P
Perchloric Acid	F	E	P	E	E
Phenol	G	G	P	G	P
Phosphoric Acid	G	E	P	E	E
Pickling Baths	G	G	P	G	E
Potassium Hydroxide	E	E	P	E	E
Propylene Oxide	F	P	G	P	P
Pyridine	F	G	G	E	F
Sodium Hydroxide	E	E	P	E	E
Sodium Peroxide	F	G	F	E	G
Stoddard Solvent	P	G	E	P	P
Styrene	P	P	G	P	P
Sulfuric Acid	P	P	P	G	P
Tannic Acid	E	E	F	E	E
Tetrachloroethylene	P	P	E	P	P
Tetrahydrofuran	P	P	F	P	P
Toluene	P	P	G	P	P
Toluene di-isocyanate	F	P	G	P	P
Trichloroethylene	P	P	E	P	P
Xylene	P	P	E	P	G

E-Excellent
G-Good
F-Fair
P-Poor

PROTECTIVE CLOTHING COMPATABILITY
WITH SELECTED CHEMICAL HAZARDS

<u>Physical Performance</u>	<u>Natural Rubber</u>	<u>Neoprene</u>	<u>Polyvinyl Alcohol</u>	<u>Polyvinyl Chloride</u>	<u>Nitrile</u>
Tear Resistance	G	G	F	F	G
Abrasion Resistance	G	G	G	G	E
Heat Resistance	F	E	P	P	E
Flame Resistance	P	G	P	P	P
Elongation	E	E	F	F	G

CHAPTER FOUR

Training Manual No. 3
RESPIRATORY TRAINING PROGRAM

prepared by
Universal Waste & Transit
Orient Road
Tampa, Florida

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RESPIRATORY PROTECTION

Figure 1. Respirator Selection According to Hazard

Air Purifying Respirators

Table 1. Color Coding of Chemicals Cartridges

Atmosphere Supplying Respiratory Protection

Self Contained Breathing Apparatus

SPECIAL PROBLEMS WITH RESPIRATORS

Temperature

Hair

Corrective Lenses

Communication

RESPIRATOR MAINTENANCE

Respiratory Protection

The choice of a respirator to be employed on an emergency response incident is not an item to be taken lightly. All too often respirators are chosen because they are comfortable; light weight; and readily available. These are not the criteria which are to be employed to insure your safety and health.

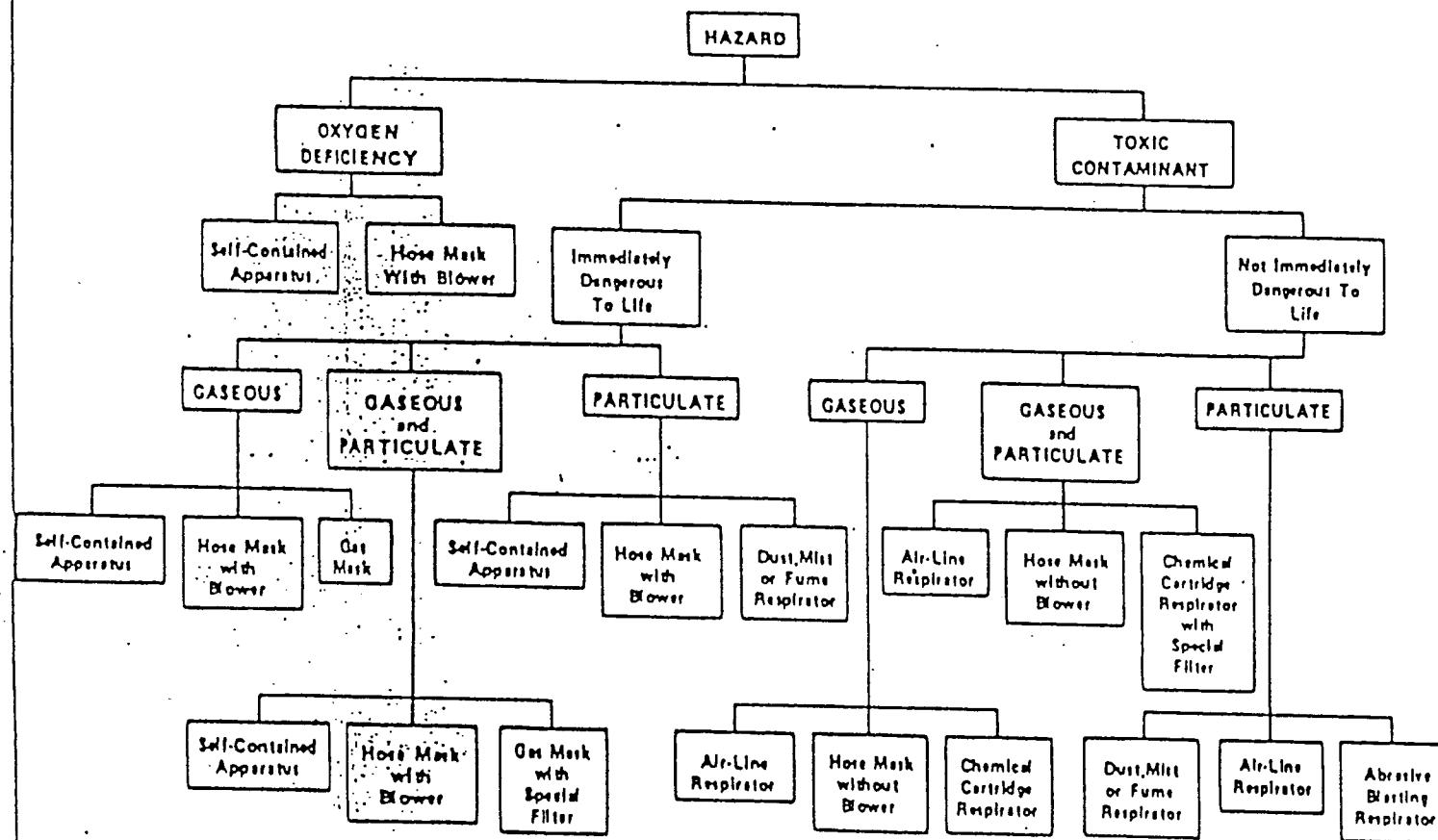
You have been assigned your own personal respirator and have been fit-tested to insure proper operation. Read both this document and Respirator Training Program II (Appendix 1) carefully. This respirator is not meant for oxygen deficient atmospheres or areas immediately dangerous to life and health. Check with your supervisor before entering any unknown area.

Certain types of respirators provide certain types of protection. Figure 1 shows a block diagram which outlines various forms of respiratory protection relative to the hazard involved.

Respiratory protection falls into two major categories:

- Air purifying

- Atmosphere supplying



Respiator selection according to hazard.

Figure 1

Air Purifying Respirators

Air purifying respirators do not supply air. They simply remove a particular contaminant from the surrounding environment to reduce the potential for occupational exposure. Air purifying respirators fall into a variety of categories indicated below:

- Single use, dust
- Quarter mask, dust
- Half mask, dust
- Half or quarter mask, high efficiency
- Half or quarter mask, fume
- Full facepiece, high efficiency
- Power, high efficiency
- Gas and vapor removing, half mask
- Gas and vapor removing, full facepiece

Mechanical filter type respirators employ a felt pad which physically removes particulate contamination from the air. They generally do not remove chemical compounds and are not air supplying respirators. These filters have a limited lifetime dependent upon the concentration of the contaminant in the environment in which you are working. When breathing resistance becomes excessive it is necessary to replace the filter media.

Chemical cartridge type respirators generally contain specially treated activated carbon which removes particular gases or fumes by means of either absorption or reaction. Once again, these types of respirators do not supply oxygen and must not be used in either an oxygen deficient environment or one which is immediately dangerous to life or health. Most cartridge type respirators are specific for certain groups of compounds, such as acids; ammonia; organic vapors; and so on. You must be certain of the contaminant present before a decision can be made as to the type of chemical cartridge which is required for that particular situation. All cartridges are color coded and labeled for their specific use. These color codes are shown in Table 1.

Table 1

PERSONAL PROTECTIVE EQUIPMENT

RESPIRATOR

COLOR CODING OF CHEMICAL CARTRIDGES

Atmospheric Contaminants to be Protected Against	Colors Assigned*
Acid gases	White.
Hydrocyanic acid gas	White with 1/2-inch green stripe completely around the canister near the bottom.
Chlorine gas	White with 1/2-inch yellow stripe completely around the canister near the bottom.
Organic vapors	Black.
Ammonia gas	Green.
Acid gases and ammonia gas	Green with 1/2-inch white stripe completely around the canister near the bottom.
Carbon monoxide	Blue.
Acid gases and organic vapors	Yellow
Hydrocyanic acid gas and chloropicrin vapor	Yellow with 1/2-inch blue stripe completely around the canister near the bottom.
Acid gases, organic vapors, and ammonia gases	Brown.
Radioactive materials, excepting tritium and noble gases	Purple (Magenta).
Particulates (dusts, fumes, mists, fogs, or smokes) in combination with any of the above gases or vapors	Canister color for contaminant as designated above, with 1/2-inch gray stripe completely around the canister near the top.
All of the above atmospheric contaminants	Red with 1/2-inch gray stripe completely around the canister near the top.

*Gray shall not be assigned as the main color for a canister designed to remove acids or vapors.

NOTE: Orange shall be used as a complete body, or stripe color to represent gases not included in this table. The user will need to refer to the canister label to determine the degree of protection the canister will afford.

Neither mechanical filter nor chemical cartridge elements should be used when entering an atmosphere or area where any of the following contaminants are present:

Oxygen Deficient Atmosphere

Areas immediately dangerous to life and health

Areas which contain any of the following chemical contaminants:

Acrolein	Hydrogen Sulfide
Analine	Methyl Isocyanate
Arsine	Methyl Bromide
Boron Hydrides	Methyl Chloride
Bromine	Methyl Iodide
Carbon Dioxide	Nitrobenzene
Carbon Disulfide	Nitrogen Oxide
Carbon Monoxide	Nitroglycerine
Carbonyls	Nitromethane
Cyanogen	Ozone
Dimethyl Analine	Perchloroethane
Dimethyl Sulfate	Phosgene
Ethyl Cyanide	Phosphene
Fluorine	Phosphorus Trichloride
Formaldehyde	Stibene
Hydrogen Cyanide	Sulfur Chloride
Hydrogen Fluoride	Toluene Diisocyanate
Hydrogen Selenide	Vinyl Chloride

Once again, it is important to remember that an assessment of the health hazards involved in a particular situation are necessary to determine what type of respiratory protection is best suited for your particular needs.

Atmosphere Supplying Respiratory Protection

In some cases it may be necessary to use air supplied respiratory protection when entering an area. This form of respiratory protection falls into three categories identified below:

Air line respirator

Hose mask with blower

Self-contained breathing apparatus

Both the air line respirator and the hose mask with blower type systems employ outside sources for supplying breathing air. This outside source can either be a compressor or bottled air.

When using a compressor for supplying breathing air, it is necessary that certain precautions be observed:

1. The compressor must be located in area where contaminated air will not be drawn into the system.
2. Sufficient safeguards must be applied to insure that the compressor itself does not generate carbon monoxide, oil mists, or hydrocarbon vapor during operation.
3. Installation of necessary filtering devices to remove any particulate contamination or oil mist.
4. A separate "escape air" or SCBA system, whereby the user of the air line respirator can proceed to an uncontaminated area in an emergency situation.
5. Do not use a compressor for an air supply unless indicated by your supervisor.

Air line respirators and hose masks with blowers provide the benefit of much longer working times, since a limited air supply is not a problem, But they also pose problems in that the hoses and/or air lines are cumbersome and tend to get in the way during work operation, as well as having the potential for being cut or crushed. These systems, however, are acceptable in oxygen deficient atmospheres so long as the requirements on the following page are met:

1. An additional escape air system, which allows sufficient time for exiting the contaminated area.
2. No more that 150 feet of hose is employed.
3. Sufficient safeguard on the air supplying equipment to insure that contamination of the source does not occur.

Self Contained Breathing Apparatus (SCBA)

The respiratory protection of choice in an oxygen deficient environment or that which is immediately dangerous to life and health (IDLH) is the self-contained breathing apparatus. These systems consist of a full or half-face respirator equipped with portable cylinder air. The major disadvantage of the SCBA system is its limited supply of air. Most systems range from 30 minutes to one hour maximum with this value being highly dependent upon the level of activity as indicated below:

<u>Activity</u>	<u>Oxygen Uptake Liters/Minute</u>
Seated	0.3
Light work	0.66
Walking	1.0
Shoveling	1.5 - 2.0
(rate and lift dependent)	

All employees should be familiar with the location and operation of SCBA's. They could save your life!

If an SCBA is used, immediately recharge the cylinder when you are finished.

Special Problems with Respirators

Temperature

Cold temperatures can cause a variety of problems when wearing respirators. These include frozen valves; face plate fogging; and brittleness of the respirator itself. Care must be exercised in handling respirators in cold weather so as not to compromise their usefulness. Vision fogging is a serious problem when using full-face respirators. Nose cups can be obtained with full-face respirators which significantly reduce facepiece fogging. Antifogging respirator sprays appear to have limited usefulness.

Hair

Both hair styles and facial hair can prove incompatible with effective respirator usage. Clean, smooth skin is required for acceptable seating and sealing of a respirator. Even one day's growth of beard can impair a respirator's effectiveness.

Corrective Lenses

When the user of a respirator requires eye glasses, special precautions must be taken to insure that these do not impair the respirators effectiveness. Special facepieces are available which can accommodate eye glasses.

Contact lenses should never be worn when working with hazardous materials. The potential for incompatible chemicals coming in contact with the contact lens and the eye is substantial. When air supplied respirators are worn, the incoming air has a tendency to dislodge the contact lens from the wearer's eye.

Communications

When wearing a respirator, communication is at best, difficult. You should learn hand signals for communication with co-workers. When SCBA's are required, you will be supplied with a radio communication system.

Respirator Maintenance

In order for a respirator to function efficiently, it must be regularly cleaned, maintained and safely stored. After each use, your respirator should be cleaned with soap and water, and disinfected: the inhalation and exhalation valves should both be checked to insure their satisfactory working condition; cartridges and/or filters should be changed; air lines cleaned; cylinders recharged; and stored in a clean, dry, and preferably warm environment. Your respirator provides you with protection from potentially life threatening situations and should be maintained with that in mind.

Appendix 1

EMPLOYEE RESPIRATOR TRAINING PROGRAM II

Universal Waste & Transit

Orient Road

Tampa, Florida

CONTENTS

General

Dual Filter Cartridge Mask

Airline Mask & Helmet

Maintenance

Emergency

General

- A. All employees must be examined by a physician to determine that they are physically able to perform the work and use respiratory protection equipment. The respirator user's medical status will be reviewed annually.
- B. Any employee using a mask type respirator shall be clean shaven to increase sealing between face and mask.
- C. Employees should familiarize themselves with the respirators by using them in an uncontaminated area for an extended period of time.
- D. Employees shall test for leaks in respirators before each use.
- E. Only NIOSH (National Institute of Occupational Safety and Health) approved respirators shall be used. The respirator furnished shall provide adequate respiratory protection against the particular hazard for which it is designed.
- F. There shall be regular inspection and evaluation to determine the continued effectiveness of the program.

Dual Filter Cartridge Mask

Limitations - Not to be used in atmospheres immediately dangerous to life and/or deficient in oxygen.

To fit respirator to face:

1. Position respirator on face, fitting wide portion under chin, and narrow portion over nose, wearing as low as possible.
2. Place one-piece lower headband around head below ears, and slip fit upper headband above ears, adjusting for tight yet comfortable fit.
3. Test for proper seal of facepiece as follows:
 1. Remove exhalation valve guard.
 2. Close exhalation valve with thumb and exhale gently.
 3. If air leakage is detected, readjust headbands until tight seal of facepiece to face is obtained.
 4. Finally, replace exhalation valve guard.

Leave Area Immediately if:

1. breathing becomes difficult
2. dizziness or other distress occurs
3. you taste or smell contaminant

Airline Mask and Helmet

Use - For protection against heavy exposures of dusts, fumes, vapors, gases, mists and smoke.

Limitations - Not to be used in atmospheres immediately dangerous to life or those deficient on oxygen.

Operating Principle

This is a supplied-air type respirator and must be connected to a suitable source of respirable air before use. Air pressure at mask should be 10 - 25 psi.

Fitting Mask - After connecting respirator to air supply line, fit as follows:

1. Hold facepiece and pull all five head straps out to the end tabs. Clasp temple and neck straps with each hand, and stretch straps over head, fitting facepiece against chin first.
2. Starting with bottom straps pull to insure a snug fit, tightening top strap last. This facepiece does not require excessive strap pressure to obtain leakproof fit.
3. The belt hook and breathing tube from the mask to the air supply line are assembled to be worn on the left side. After mounting belt hook, turn the head toward the right side to make sure there is no undue pull of the breathing tube on the facepiece. If this leaves too large a loop of the tube on the left side when the head is turned back, adjust the position of the belt hook.

Fitting Helmet-After connecting respirator to air supply line, fit as follows:

Place helmet onto head and adjust headband. White shroud is to be placed underneath clothing and draw string is to be pulled until shroud fits snugly. Then pull yellow shroud over clothing or protective suit. Pull face mask down.

Air Flow Regulation

After the facepiece and breathing tube are properly adjusted, the air flow can be regulated to suit the wearer. To decrease air flow, unscrew adjustment nut on regulating valve until desired setting is reached. This adjusting valve is so constructed that the air supply cannot be shut off completely when connected.

Leave Area Immediately if:

1. Breathing becomes difficult
2. Dizziness or other distress occurs
3. You taste or smell contaminant

Maintenance

- A. Cartridges for respirators must be replaced immediately as soon as employee can taste or smell contaminant. Do not substitute different types of cartridges.
- B. Respirators shall be cleaned and disinfected daily. Respirators can be cleaned with a mild detergent and water. Disinfection can be accomplished by immersing masks in a chlorine solution (2 tablespoons of bleach per gallon of water) for two (2) minutes. Respirators are then to be generously rinsed and allowed to air dry.
- C. Respirators shall be inspected during cleaning. Worn or deteriorated parts shall be replaced.
- D. When not in use respirators shall be protected from dust, sunlight, heat, extreme cold, excessive moisture, and damaging chemicals.
- E. Respirators should be placed in re-usable plastic bags until reissue. They shall be stored in a single layer with the facepiece and exhalation valve in a more or less normal position to prevent the rubber or plastic from taking a permanent distorted "set".
- F. Respirators shall be stored in a rigid storage cabinet or chest.

Emergency

In case of emergency, personnel in the air supplied respirators are responsible to assist and/or remove any injured or unconscious employee(s) from the contaminated area to an uncontaminated area; administer necessary first aid; (in particular, mouth-to-mouth resuscitation), and summon medical assistance as per emergency phone numbers listed at the site. Personnel should commit these emergency numbers to memory.

In addition, employees should leave the area immediately if:

1. Breathing becomes difficult
2. Dizziness or other distress occurs
3. Employee tastes or smells contaminant

CHAPTER FIVE

Training Manual No. 4

BASIC EMERGENCY TRAINING GUIDE

prepared by
Universal Waste & Transit,.
Orient Road
Tampa, Florida

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Introduction

Universal Waste & Transit specializes in the packaging; handling; transportation; storage and treatment of hazardous wastes. The company also responds to emergency incidents such as chemical or petroleum spills and abandoned waste disposal site cleanup. You therefore could come into contact with a variety of potentially hazardous materials. These include:

- Poisons
- Flammable Liquids
- Flammable Solids
- Water or Air Reactives
- Explosives
- Oxidizers
- Corrosives
- Aerosol Containers
- Gas Cylinders

All of these materials are classified as hazardous and precautions are required to insure your safety when responding to any emergency situation.

Training

You are required to attend certain training sessions and to successfully pass these courses prior to working on any Universal Waste & Transit job site. These courses include:

1. Personnel Protective Equipment
2. Respirator Training Program
3. Fire Safety and Response
4. Facility Operations
5. Basic First Aid
6. Cardiopulmonary Resuscitation (CPR)

You are also required to familiarize yourself (with your supervisors assistance) with the following documents.

1. Universal Waste & Transit Emergency Response Contingency Plan
2. Universal Waste & Transit Waste Analysis Plan
3. Universal Waste & Transit Inspection Plan
4. DOT Guide to Hazardous Materials
5. CHRIS Manual
6. NIOSH Worker Safety Bulletin
7. NSWMA 8 Part Brochure Series on Hazardous Waste
8. USEPA Hazardous Waste Criteria

These plans should be reviewed and completely understood prior to your participation in any actions. Along with this, you should also familiarize yourself with the equipment available to you during any emergency response. There will be in-depth discussions about personnel protection equipment, but you should also become familiar with the operation of the necessary support equipment which is required such as pumps; compressors; generators; emergency lighting; containment and sorbent materials; heavy equipment; and even hand tools. The time to learn the operation of these items is not when you are already on-site. This equipment is important to you, both to insure a rapid response to an emergency situation, as well as for your own personal safety. Learn its proper operation and maintenance before you are required to use it.

Medical Monitoring

Your personal safety is of the utmost importance at all times. In order for you to be aware of your physical condition, it is important that a medical monitoring program be established for you. This monitoring program is simply a screening which evaluates your general physical condition, as well as certain parameters in both blood and urine samples. It allows our physician to determine if you have been exposed to specific hazardous substances and also aids in determining what personnel can be assigned to high stress work environments.

The frequency, type and number of examinations is dependent upon the following items:

1. The degree of, or the potential for, exposure to various compounds.
2. The physical, chemical, or biological materials which may be encountered.
3. The potential for acute (short-term) or chronic (long-term) health effects.

At a minimum you will have a complete medical review at least annually. All costs are covered by Universal Waste & Transit. It should be remembered that medical monitoring, or health surveillance is simply an additional means to help protect your health. Most exposures to hazardous materials should be prevented by the effective use of personnel protective equipment, engineered safeguards and safe working practices. A listing of recommended medical monitoring parameters is included as Table 1.

Table 1

MEDICAL MONITORING PARAMETERS

Blood Pressure

Pulse

Respiration

Pulmonary Function

Forced Vital Capacity

Expiratory Volume

Reserve Volume

Blood Analyses - Chemical Screen

Urinalysis

Chemical Compatibility

Since the end of World War II there have been over 50,000 new chemicals created and over 1,000 new ones are produced each year. Some of these are not compatible with others. When noncompatible materials are mixed a number of reactions can result. These include:

- release of heat
- polymerization (hardening)
- generation of gases
- fire
- explosion

All of these reactions are dangerous. It is your responsibility to insure that non-compatible materials remain segregated.

All containers are sampled before they enter the Universal Waste & Transit facility. These samples are analyzed at a certified laboratory to determine their chemical composition. After analysis these containers are labeled according to Department of Transportation (DOT) regulations. These labels or placards can help you keep non-compatible materials segregated. Your "DOT Guide to Hazardous Materials" booklet describes what containers must be segregated.

Table 2 lists chemical compatibilities for a variety of compounds.

Specifically, the following materials should remain segregated from each other:

- acids should not be placed with alkaline wastes
- acids should not be placed with cyanide/sulfide bearing wastes
- ignitables should be placed only in the flammable storage area

Most waste materials can be placed in DOT approved steel containers. Exceptions to this would be corrosive wastes (pH less than 2 or greater than 12.5); which should be placed in DOT approved polyethylene containers.

Your supervisor must tell you which containers are to be placed into what storage location. If you have questions or concerns - Ask before Acting!!! Safety Always Comes First.

Spill Response

The contingency plan details certain actions to be taken for a spill or release. Read It Carefully! Emergency telephone numbers are posted above every telephone.

If a spill occurs do not try to hide it. Contact your supervisor immediately or sound the air horns located throughout the building. Immediately thereafter put on the necessary protective equipment. (located in safety cabinets)

After notification and putting on protective equipment - contain the spill!!!

A wide variety of containment equipment is available including:

- containment booms
- sorbent booms
- sorbent pads
- oil-dri
- plug and dike sealant
- overpack drums
- plug rugs

Do not use water to contain a spill!! The "hazorb" material is chemically inert. It will not react with the spilled material. This should be your first choice for containment.

Members of the Universal Waste spill response group are readily available and will be responsible for any further actions. However, your immediate response to a spill or release is necessary to protect the environment. Learn where all necessary spill control materials are kept and how to use them in an emergency.

Attached to this as Table 3 are various response actions for numerous chemicals. These are also included in the contingency plan as well as being kept in the safety cabinets.

Fire Fighting

Flammable materials are stored at UW&T. The room where these materials are located has been designed to reduce, as much as possible, any fire hazard. You are the key to making this system work!

If you follow certain, simple rules the hazard involved is minimal.

These are:

1. NO forklifts or tow motors are allowed in the flammable area.
2. Use a grounding strap on every drum you move into or out of the flammable area.
3. Use only non-sparking tools
4. Never use any electrical tools or equipment in the flammable area. Explosion-proof pumps and tools are available. Ask your supervisor before using any of these.
5. Do not use flashlights in this area. They can spark when turned on.
6. An explosivity meter is available - learn its use - check the room before entering. The reading must be less than 15% of the lower explosive limit (LEL). If not contact your supervisor immediately.
7. Only drums with "flammable" or "combustible" labels are to be stored in this area.

You must think safety at all time. If there is any question about what you are asked to do - don't act until you are sure!

Fire Fighting Equipment

There are four classes of fires. Those are:

Class A Fires in ordinary combustible materials such as wood, cloth or paper.

Class B Fires in flammable liquids or petroleum products such as solvent or paint.

Class C Fires involving electrical equipment.

Class D Fires in combustible metals such as sodium or magnesium.

Throughout the building are 10 pound fire extinguishers for class A, B or C fires. These are clearly identified with red markings.

There are two specialized "halon" fire extinguishers in the flammable room. These are excellent for class B and C fires. They are identified by red markings.

A complete description of reaction to a fire is given in the Contingency Plan. Read and familiarize yourself with these responses. You are required to attend the following fire prevention presentations:

Hazardous Waste & Fire Service

Using Fire Extinguishers - The Right Way

Your supervisor will schedule these presentations.

Any violation of the safety aspects of this section are grounds for dismissal.

Contamination/Decontamination

Whenever you respond to an emergency incident, you are generally entering a "contaminated" area. The material which you are encountering is normally hazardous in one form or another. The intent of your job is to remove that hazard as quickly and as efficiently as possible. You do not want to contaminate other areas.

You should always make the assumption that everything you are wearing is contaminated. If you are wearing disposable clothing, these should be discarded in their appropriate containers. The following regimen for removal of contaminated clothing is suggested.

1. Remove gloves and discard for either disposal or cleaning.
2. Put on new disposable gloves.
3. Remove protective clothing and either discard or place aside for cleaning.
4. Remove boots and either discard or set aside for cleaning.
5. Remove respirator and eye protection - set aside for cleaning and decontamination.
6. Remove gloves and discard.

A shower will be available between the contaminated area and clean area for both worker safety and to insure that no additional contamination results. Clean clothing would be available in the uncontaminated area. The decontamination process should occur each time a worker leaves the contaminated area. Obviously no smoking, eating or drinking is acceptable in the contaminated area.

All contaminated protective clothing should be either disposed or cleaned in the appropriate solutions. Soap and water is always a good start for decontaminating protective clothing and equipment. Subsequent cleaning with additional materials may be required dependent upon the specific contaminant. You must allow sufficient time for the protective clothing to dry before it is to be reused, or a sufficient quantity of protective clothing must be available so that this does not become a problem.

You are supplied with at least 5 sets of work uniforms, more are available as necessary. You are required to wear a clean uniform at the beginning of each working day. If you are working with containers of hazardous waste you must wear the following:

- Disposable tyvek suit

- Disposable gloves

- Safety glasses

- Boots

When leaving the storage/treatment area you are to discard all disposable items.

When leaving at the end of a work day all employees are required to change from their work uniform and enter their street clothes. No uniforms are to be taken home!!!

Any violation of this section is grounds for dismissal.

First Aid

Within thirty days after employment or as soon as possible you are required to attend and complete the following courses:

Emergency First Aid

CPR Training

These will be scheduled during normal working hours and you will be paid for the time spent in class.

You and your co-workers depend heavily upon each other. You should never work in the storage or treatment area alone. There must be at least one other person in the immediate area.

In the event that an emergency situation should arise, you should be aware of certain steps which must be taken immediately. Most importantly, you should never enter a situation immediately dangerous to life and health alone. At a minimum, two people should be available, both of which are equipped with lifelines and are physically capable of removing the other person should the need arise. You should have undergone basic first aid and cardiopulmonary resuscitation (CPR) training. You should be able to identify certain symptoms, either from yourself or your co-worker and be able to give emergency first aid should the need arise.

Only severe emergency situations will be discussed at this time, but they could be of tremendous assistance to you or your co-workers.

Chemical Burns Remove contaminated clothing; flush with large volumes of water immediately; do not apply neutralizing or buffering agents; do not consider chemical antidotes; do not remove goggles until the head and face area have been thoroughly flushed. Contact a physician if necessary.

Chemical Burns

of the eye - Remove glasses and flush immediately with tap water, eye wash, or a gentle stream of water from a hose. Time is extremely important. The eyelid should be forcibly held apart so that all areas of the eye are flushed. Minimum flushing time is thirty minutes. Cover the eye and immediately transport to emergency facilities.

Asphyxiation

(poisoning by

inhalation) - Remove from the exposed area as soon as possible, keep patient warm and lying down, and if breathing has stopped begin cardiopulmonary resuscitation (CPR).

In the event of any accident, attempt to obtain as much information as possible concerning the route of exposure and the contaminant. Relay this information to the appropriate medical authorities.

Warm weather can be devastating to a worker. During these periods of time you are normally working under high levels of stress and involved in heavy manual labor. You are outfitted in garments and protective equipment which allow little, if any, body cooling. You are generally burdened by uncomfortable, cumbersome, and possibly heavy protective clothing, all of which makes life, in general, quite miserable. Your production of body heat, when combined with the outside air temperature, will generally restrict you to shortened work cycles. The table below indicates how much body heat is produced during various activities in a 160-lb man:

<u>Activity</u>	<u>Body Heat Produced (kilocalories/hour)</u>
Rest (seated)	90
Light machine work	200
Walking	300
Shoveling (rate and lift dependent)	450-600
When the ambient air temperature exceeds 79 degrees and you are	

producing more than 300 kilocalories per hour, your work efficiency is greatly reduced. Man is capable of adjusting to hot environments, however, this adjustment takes normally about a week, during which time the body will undergo a series of changes that make further heat exposures more endurable.

You should, wherever possible, distribute your daily work load into shortened work-rest cycles. The rest period gives your body an opportunity to get rid of excess heat; slows down the production of internal body heat; and provides greater blood flow to the skin. During this rest cycle you should proceed to the decontamination area, remove all contaminated clothing to expose as much of your body as possible to the outside air; and rest. Fluids should be taken as often as possible.

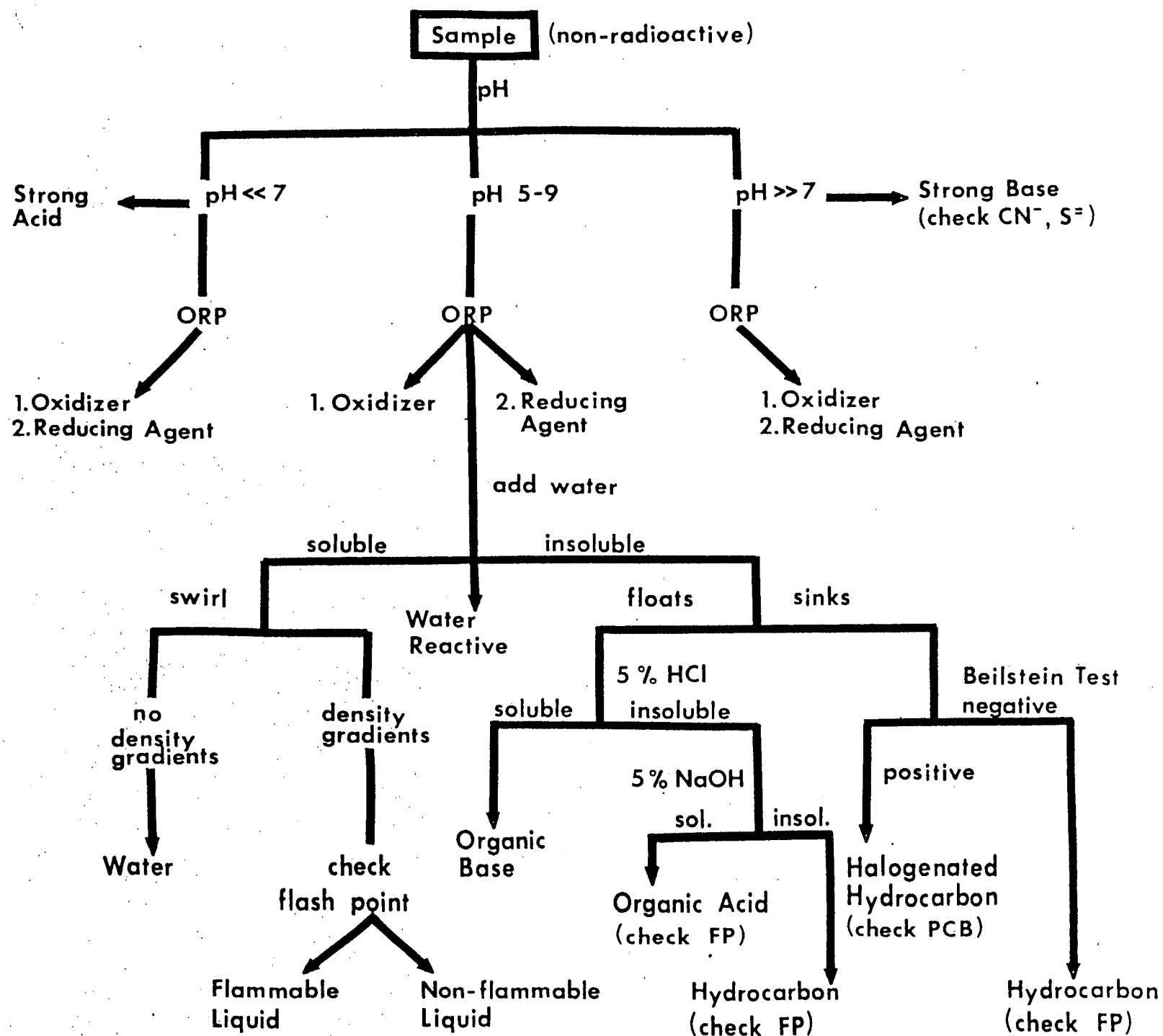
WORKER RIGHTS UNDER THE OCCUPATIONAL
SAFETY AND HEALTH ACT (OSHA)

Among your rights as an employee are the right to:

- a safe and healthful workplace as required under the OSHAct;
- review copies of standards and other rules, regulations and requirements under the OSHAct that your employer should have readily available;
- speak to your employer about safety and health hazards in your workplace, about precautions that may be taken, and procedures you should follow if you are involved in an accident or exposed to toxic substances;
- ask for an evaluation of your workplace by the National Institute of Occupational Safety and Health (NIOSH) or to file a complaint with OSHA requesting an inspection by OSHA if you believe hazardous conditions or violation of standards exist in your workplace, and the right to ask OSHA not to reveal your name;
- obtain access to any of your medical records or records of exposure to toxic substances which your employer may have;
- have your authorized employee representative accompany the OSHA compliance officer during an inspection of your workplace;
- respond to questions from the OSHA compliance officer during an inspection of your workplace;
- protection from being fired or punished in any way for exercising your rights under the OSHAct (if you've been fired or punished, you must tell the nearest OSHA officer within 30 days).

Table 1

COMPATIBILITY TREE



SCREENS FOR: 1. Strong Acids
2. Strong Bases
3. Oxidizers
4. Reducing Agents
5. Cyanides & Sulfides

6. Water Reactives
7. Flammable Liquids
8. Halogenated Hydrocarbons
9. PCB's

ACID STRENGTH

STRONG ACIDS

HClO_4	PERCHLORIC
H_2SO_4	SULFURIC
HCl	HYDROCHLORIC
HNO_3	NITRIC

WEAK ACIDS

H_3PO_4	PHOSPHORIC
HNO_2	NITROUS
HF	HYDROFLUORIC
CH_3COOH	ACETIC
H_2CO_3	CARBONIC
HCN	HYDROCYANIC
H_3BO_4	BORIC

ACID SALTS

NaHSO_4	SODIUM BISULFATE
FeCl_3	FERRIC CHLORIDE
FeSO_4	FERROUS SULFATE
NaH_2PO_4	SODIUM DIHYDROGEN PHOSPHATE

BASE STRENGTH

KOH	POTASSIUM HYDROXIDE (LYE)
NaOH	SODIUM HYDROXIDE (CAUSTIC SODA)
Ca(OH) ₂	CALCIUM HYDROXIDE (SLAKED LIME)
Na ₂ CO ₃	SODIUM CARBONATE (SODA ASH)
CaCO ₃	CALCIUM CARBONATE (LIMESTONE)
Mg(OH) ₂	MAGNESIUM HYDROXIDE
NaHCO ₃	SODIUM BICARBONATE

COMMON REDUCING AGENTS

FERROUS SALTS

HYDRIDES*

BOROHYDRIDES*

ORGANICS

TIN, IRON OR ZINC DUST

STANNOUS CHLORIDE

* WATER REACTIVE

COMMON OXIDIZING AGENTS

H_2O_2 HYDROGEN PEROXIDE

Cl_2 CHLORINE

HYPOCHLORITE SALTS

$NaOCl$ SODIUM HYPOCHLORITE

$Ca(OCl)_2$ CALCIUM HYPOCHLORITE

PERMANGANATES

$KMnO_4$ POTASSIUM PERMANGANATE

$HClO_4$ PERCHLORIC ACID

H_2SO_4 SULFURIC ACID

HNO_3 NITRIC ACID

Table 2

COMPATIBILITY OF HAZARDOUS WASTES

Part 1

From "A Method for Determining Incompatibility of Hazardous Wastes",
EPA 600/2-80-076 April, 1980

SECTION 4

METHOD FOR DETERMINING COMPATIBILITY OF HAZARDOUS WASTES

APPLICATION

This method is used to determine the compatibility reactions of most binary combinations of most hazardous wastes. The method is applicable to four categories of wastes based on information available, namely: 1) compositions unknown, 2) compositions known specifically, 3) compositions known nonspecifically by chemical classes or reactivities, and 4) compositions known nonspecifically by common or generic names only.

The method starts with a compatibility analysis flow chart (Figure 1) indicating the analysis pathways for the four categories of wastes above, followed by the compatibility reaction criteria and the stepwise procedures for determining compatibility.

COMPATIBILITY REACTION CRITERIA

The reactions between binary combinations of wastes are NOT COMPATIBLE according to this method when the following undesirable and hazardous consequences are produced:

Reaction Codes (RC)	Reaction Consequences
H	Generates heat by chemical reaction
F	Produces fire from extremely exothermic reactions, ignition of reaction mixtures or of the reaction products.
G	Generates innocuous gases such as N_2 , CO_2 , etc. but can cause pressurization and rupture of closed containers
GT	Generates toxic gases such as HCN, H_2S , etc.
GF	Generates flammable gases such as H_2 , C_2H_2 , etc.
E	Produces explosion due to extremely vigorous reactions or reactions producing enough heat to detonate unstable reactants or reaction products.
P	Produces violent polymerization resulting in the generation of extreme heat and sometimes toxic and flammable gases.
S	Solubilizes toxic substances including metals

The RC are used in the compatibility chart (Figure 6) to denote the potential hazardous reaction consequences that can result from the binary combinations of the wastes.

PROCEDURES FOR DETERMINING COMPATIBILITY

Five main steps are required in the step-by-step procedures for determining the reaction compatibility of any Wastes A and B. The procedures are conducted with reference to Figure 1 (Flow Diagram for Determining Hazardous Wastes Compatibility), Figure 6 (Hazardous Wastes Compatibility Chart), Appendix 1 (List of Chemical Compounds), Appendix 2 (List of Wastes Constituents by Chemical Classes and Reactivities), and Appendix 3 (List of Wastestreams by Common or Generic Names).

Step 1: Obtain as much information as possible about the history and compositions of the wastes. Such information can usually be obtained from the records of the waste producers, the manifests that accompany the wastes and examination of the processes that produced the wastes. When no information is available, collect representative samples of the wastes and submit them for analysis. The analysis should provide information on the specific chemical constituents or classes of compounds in the wastes.

Step 2: Starting with Waste A, list down on the worksheet (Figure 2) on the column for Waste A, the chemical names or classes of compounds in the waste or the generic names of the waste. The composition of the waste is Known Specifically when the constituents are listed by chemical names such as ethylene glycol, sodium nitrate, etc.; Known Nonspecifically by classes when the constituents are identified only by chemical classes or reactivities such as alcohols, caustics, mercaptans, etc. The waste is Known Nonspecifically by generic names when classified as spent caustic, tanning sludge, copper plating waste, etc.

Step 3: When the composition of Waste A is Known Specifically by chemical names, consult Appendix 1. Find the chemicals in the list and note down their respective Reactivity Group Numbers (RGN) in the Worksheet. If a chemical component is not listed in Appendix 1, look for its synonym(s) (Ref. 7, 14, 21, 30, 32, 37, 41, 54, 59, 69, 70, 76) and note down its RGN (Section 4.4, Example 1, Note 2). When no synonym can be found, the RGN of the component may be alternatively determined based on its chemical class or reactivity (Section 4.4, Example 1, Note 3).

When the composition of the waste is Known Nonspecifically by chemical classes or reactivities only, consult Appendix 2 and note down the corresponding RGN on the Worksheet (Section 4.4, Example 2).

When the composition of the waste is Known Nonspecifically but classified by common or generic names, consult Appendix 3 and note down the RGN in the Worksheet (Section 4.4, Example 3).

Step 4: Repeat steps 2 and 3 for Waste B and list down the information on the column for Waste B on the Worksheet.

Step 5: Consult the Hazardous Wastes Compatibility Chart in Section 5 and determine the Reaction Codes (RC) between any binary combinations of RGN of Wastes A against

B. Note all RC on the Worksheet. If no RC are listed, Wastes A and B are compatible and vice versa.

SPECIFIC EXAMPLES

The following examples illustrate the stepwise procedures for determining the compatibility of hazardous wastes:

Example 1 - Composition Known Specifically

Step 1: The manifests identify the constituents of the wastes specifically as follows:

Waste A contains ethylene glycol, chlorobenzene, and hydrochloric acid.

Waste B contains isooctane and sodium sulfide.

List the components of Waste A on the column for Waste A on the Worksheet (Figure 2). Consult Figure 1 and follow the compatibility flow diagram for Composition Known Specifically.

Step 2: Find the RGN of the components: ethylene glycol, chlorobenzene and hydrochloric acid in Appendix 1. Thus, the RGN for the components are: ethylene glycol - 4, chlorobenzene - 17, and hydrochloric acid - 1.

Step 3: Record the RGN of the components on the Worksheet.

Step 4: List the components of Waste B on the column for Waste B on the Worksheet. Repeat steps 2 and 3 for Waste B. Thus, the RGN of the components of Waste B are as follows: Isooctane-29, and sodium sulfide-33.

Step 5: Pair up each listed RGN of Waste A against that of Waste B. Hence the following pairs are possible: 4 & 29, 4 & 33, 17 & 29, 17 & 33, 1 & 29, 1 and 33. For each pair, find the Reaction Codes (RC) in the Hazardous Wastes Compatibility Chart (Figure 6). Record the corresponding RC for each pair in the Worksheet. Note that the RC for all binary combinations of RGN for wastes A and B are blank except for RGN 1 & 3 which are GF. The completed Worksheet is shown in Figure 3.

Conclusion: Waste A is incompatible with Waste B. Potential hazard of toxic (GT) and flammable (GF) gas formations are indicated if the wastes are mixed.

NOTE 1: If Waste A contains a water reactive constituent (RGN 107) and Waste B contains an aqueous component, then water (RGN 106) should be listed as one of the hazardous components for Waste B in Step 1.

NOTE 2: If a chemical constituent is not listed in Appendix 1, its synonym(s) can be obtained from chemical references (Ref. 7, 14, 21, 30, 32, 37, 41, 54, 59, 69, 70, 76) and used to determine its RGN. For example, Pyranon is a chemical not listed in Appendix 1. By consulting the Merck Index (Ref. 54), the synonym for this chemical is diacetone alcohol which is listed in Appendix 1 with RGN of 4 and 19. Thus, the compatibility of this compound with other waste constituents can be established in the same way as Example 1.

NOTE 3: When a synonym for an unlisted compound cannot be found, the RGN under which it is listed may be derived by molecular functional groups or chemical reactivity. For example, isobutyl carbinol is not listed in Appendix 1. The Merck Index (Ref. 54), however, lists the compound as an alcohol. Therefore, by consulting Appendix 2, isobutyl carbinol may be classified under RGN 4. When the compound contains more than one functional groups, all applicable RGN must be identified. A compound like peroxosulfuric acid is not listed in Appendix 1. This compound, however, is known to be a strong mineral acid as well as a very powerful oxidizing agent. Therefore, the compound may be classified under RGN 2.

Example 2 - Composition Known Nonspecifically by Chemical Classes or Reactivities.

Step 1: The manifests identify the wastes constituents as follows:

Waste A contains toxic metals, aldehydes and alcohols.

Waste B contains toxic metals and oxidizing agents.

List the components of Waste A on the column for Waste A on the Worksheet (Figure 2). Consult Figure 1 and follow the compatibility flow diagram for composition Known Nonspecifically by Chemical Classes or Reactivities.

Step 2: Find the RGN for toxic metals, aldehydes and alcohols in Appendix 2. Thus, the RGN for the components are: toxic metals - 24, aldehydes -5, and alcohols - 4.

Step 3: Record the RGN of the components on the Worksheet.

Step 4: List the components of Waste B in the column for Waste B on the Worksheet. Repeat steps 2 and 3 for Waste B. Thus, the RGN for the components of Waste B are: toxic metals - 24 and oxidizing agents - 104.

Step 5: Determine the compatibility of Waste A and B in the same manner as in Step 5 of Example 1. The completed Worksheet for this example is shown in Figure 4.

Conclusion: Waste A is incompatible with Waste B. Potential for heat and fire generations (H_F) are indicated if the wastes are mixed.

Example 3 - Composition Known Nonspecifically by Common or Generic Names of Wastes

Step 1: The manifests describe the wastes as follows:

Waste A is a metal plating waste.

Waste B is a pectin waste from the production of citrus products.

List the generic name of Waste A on the column for Waste A on the Worksheet (Figure 2). Consult Figure 1 and follow the compatibility flow diagram for composition Known Nonspecifically by Common or Generic Names of Waste.

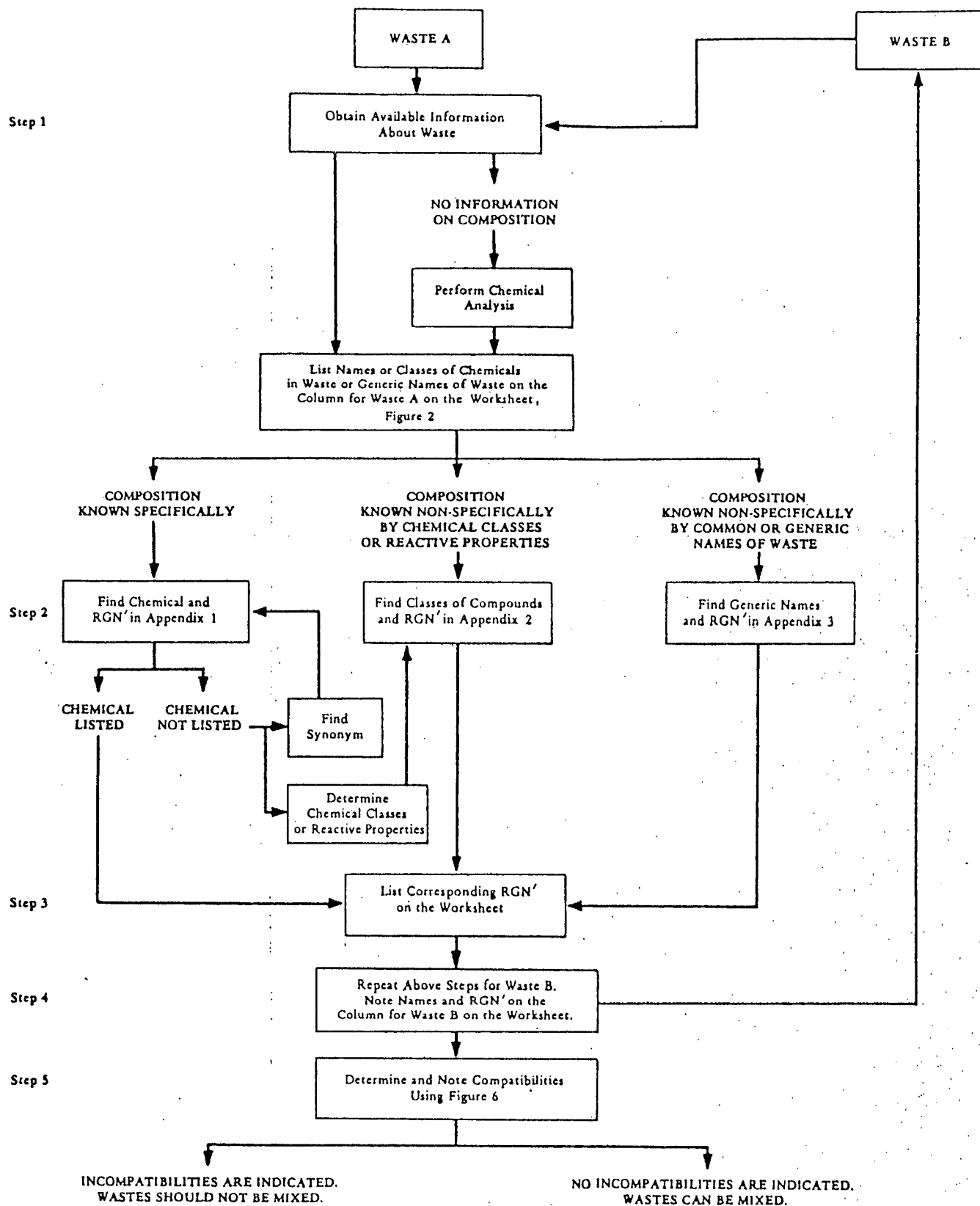
Step 2: Find the RGN of "metal plating waste" according to Appendix 3. The RGN for this generic waste are 11 and 24.

Step 3: Enter the RGN of Waste A on the Worksheet.

Step 4: Enter the waste generic name of "Citrus Pectin Waste" on the column for Waste B on the Worksheet. Repeat steps 2 and 3 above for Waste B. Thus, the most likely RGN for this generic waste are 1 and 4.

Step 5: Determine the compatibility of Waste A and B in the same manner as in Step 5 of Example 1. The completed Worksheet for this example is shown in Figure 5.

Conclusion: Waste A is incompatible with Waste B. Potential hazards of toxic and flammable gas formations (GT_{GF}) are indicated if the wastes are mixed. Also solubilization (S) of metals may occur.



Note: 1. Reactivity Group Numbers

Figure 1. Flow diagram for determining hazardous waste compatibility.

Waste B _____ Source _____

Name of Waste _____
Evaluation _____ Date _____

[illegible]

Figure 2. Worksheet for determining hazardous waste compatibility.

EXAMPLE 1

Waste A _____ Source _____

Waste B _____ Source _____

Name of Waste Evaluation _____ Date _____

Name	Reactivity Group No.	WASTE B							
		Reactivity Group No.	Name	29	33				
			Isooctane		Sodium Sulfide				
Ethylene Glycol	4								
Chlorobenzene	17								
Hydrochloric Acid	1				GT GF				

Note: Refer to Figure 6 for the definitions of the Reaction Code entered on the squares of this worksheet.

Figure 3. Completed worksheet for determining hazardous waste compatibility when the wastestream compositions are known specifically.

(

Name of Waste Evaluation	Date
--------------------------	------

Note: Refer to Figure 6 for the definitions of the Reaction Code entered on the squares of this worksheet.

EXAMPLE 3

Waste A _____ Source _____

Waste B	Source

Name of Waste Evaluation _____ Date _____

[illegible]

Note: Refer to Figure 6 for the definitions of the Reaction Code entered on the squares of this worksheet.

Figure 5. Completed worksheet for determining hazardous waste compatibility when wastestream compositions are known non-specifically by generic names.

SECTION 5

HAZARDOUS WASTES COMPATIBILITY CHART

INTRODUCTION

The chart (Figure 6) is the single most important part of this report. It is a quick and ready reference for determining the compatibility reactions of most binary combinations of hazardous wastes. It is used in conjunction with the detailed compatibility analysis procedures in Section 4.

DESCRIPTION OF THE CHART

The 41 reactivity group classifications of hazardous wastes listed in Appendix 2 are presented in this chart.

The first column of the chart lists the reactivity groups by Reactivity Group Numbers (RGN). The first 34 RGN which are based on chemical classes or molecular functional groups are listed consecutively from 1 to 34. The last 7 RGN which are based on general chemical reactivities are listed consecutively from 101 to 107. The second column lists the corresponding reactivity group names. The first 34 group names are each followed by a number of reaction squares equal to their respective RGN. In other words, RGN 1 is followed by 1 square, RGN 2 by 2 squares, etc. The group names designated by RGN 101 to 107 are followed by 34, 36, 37, 38, 39, 40 and 41 squares, respectively. The squares form rows as well as columns of squares on the chart. A terminal square of a row represents a binary combination of one reactive group with itself and is labelled with its RGN. The terminal squares serve as headings for the columns of squares and as a whole appear as a diagonal row of squares on the chart. An additional bottom row of squares is correspondingly labelled as the diagonal row of squares. The RGN on the first column of the chart and those on the diagonal and bottom rows of squares provide the reference coordinates for locating the potential hazardous reaction consequences of any binary combinations of the wastes reactivity groups.

The rest of the squares on the chart are either blank or filled in with Reaction Codes (RC). When a square is blank, the wastes in the binary combination represented by that square are compatible. Conversely, any RC on the squares indicate potential incompatible reactions that can result from the combination of the wastes reactivity groups represented by the individual squares. The predicted reactions are based on the combinations of the most reactive chemicals in the respective reactivity groups. All the binary wastes combinations designated with RC are described in greater detail in Appendix 4. Where waste combinations are believed to be incompatible but no sufficient supporting data have been found in the literature, incompatible reactions are also noted and marked on the chart with RC or "U". The RC are identified in the

legend on the upper right hand corner of the chart and described in detail in Section 4.2. The multiple RC are explained in Section 5.4.

PROCEDURES FOR USING THE CHART

Step 1: For the binary combination of any reactivity groups, first find the Reactivity Group Number (RGN) of the first group on the first column of the chart.

Step 2: Find the RGN of the second group from the bottom squares of RGN.

Step 3: Find the intersecting reaction square for the two RGN.

Step 4: Note the Reaction Code(s) (RC) in the square.

Step 5: Refer to the legend on the chart or Section 5.4 for the explanation of the RC.

Step 6: When no RC is found on the reaction square, the two groups of wastes are compatible. When any RC are noted on the square, the wastes are incompatible when mixed or allowed to come in contact with one another.

EXPLANATION OF THE MULTIPLE REACTION CODES

For many binary combinations, multiple Reaction Codes (RC) are used to denote the reaction consequences. The order in which these letter codes appear in the squares corresponds to the order in which the consequences can occur. For example, in RC (HFE), the first letter denotes the initial or primary hazardous consequence of a binary reaction which in this case is HEAT generation. The second and third letters denote the resulting secondary consequences of the production of FIRE and EXPLOSION from the heat generated by the primary reaction. In some cases the third letter code refers to a resulting tertiary consequence such as the evolution of a toxic gas from a fire caused by excessive HEAT generation (HFGT). Where the codes GT_{GF} appear, the GASES evolved are TOXIC and FLAMMABLE such as hydrogen sulfide, hydrogen cyanide, or carbon disulfide. The relative positions of the letter codes to one another in this case bear no significance. The codes can also be written as GF_{GT}.

LIMITATIONS OF THE CHART

The potential reaction consequences predicted by the chart are based on pure chemical reactions only at ambient temperature and pressure. Concentration, synergistic, and antagonistic effects have been assumed not to influence the reactions. The reactions have not as yet been validated on actual wastes containing the chemicals.

REACTIVITY GROUP NO.	REACTIVITY GROUP NAME													
1	Acids, Mineral, Non-oxidizing	1												
2	Acids, Mineral, Oxidizing		2											
3	Acids, Organic			3										
4	Alcohols and Glycols	H	H _F	H _P	4									
5	Aldehydes	H _P	H _F	H _P		5								
6	Amides	H	H _{GT}				6							
7	Amines, Aliphatic and Aromatic	H	H _{GT}	H		H								
8	Azo Compounds, Diazo Compounds and Hydrazines	H _G	H _{GT}	H _G	H _G	H				8				
9	Carbamates	H _G	H _{GT}						H _G	9				
10	Caustics	H	H	H		H				H _G	10			
11	Cyanides	GT	GF	GT	GF					G			11	
12	Dithiocarbamates	H _{GF}	H _{GF}	H _{GF}	H _{GF}	GF	GT		L'	H _G				12
13	Esters	H	H _F							H _G	H			13
14	Ethers	H	H _F											
15	Fluorides, Inorganic	GT	GT	GT										
16	Hydrocarbons, Aromatic		H _F											
17	Halogenated Organics	H _{GT}	H _F	GT				H _{GT}	H _G	H _{GF}	H			
18	Isocyanates	H _G	H _F	GT	H _G	H _P		H _P	H _G	H _P	H _G	L'		
19	Ketones	H	H _F						H _G		H	H		
20	Mercaptans and Other Organic Sulfides	GT	GF	H _F	GT				H _G					
21	Metals, Alkali and Alkaline Earth, Elemental	GF	H _F	GF	H _F	GF	H _F	GF	H _F	GF	H _F	GF	H _F	GF
22	Metals, Other Elemental & Alloys as Powders, Vapors, or Sponges	GF	H _F	GF	H _F	GF			H _F	GT	L'	GF	H	
23	Metals, Other Elemental & Alloys as Sheets, Rods, Drops, Moldings, etc.	GF	H _F	GF	H _F				H _F	G				
24	Metals and Metal Compounds, Toxic	S	S	S				S	S			S		
25	Nitrides	GF	H _F	H _F	GF	H _F	GF	H _F		L'	H _G	L'	GF	GF
26	Nitriles	H _{GT}	H _F	GT	H						L'			
27	Nitro Compounds, Organic		H _F	GT		H					H _E			
28	Hydrocarbons, Aliphatic, Unsaturated	H	H _F			H								
29	Hydrocarbons, Aliphatic, Saturated		H _F											
30	Peroxides and Hydroperoxides, Organic	H _G	H _E		H _F	H _G		H _{GT}	H _F	H _F	GT		H _E	H _F
31	Phenols and Cresols	H	H _F						H _G					
32	Organophosphates, Phosphothioates, Phosphodithioates	H _{GT}	H _{GT}						U		H _E			
33	Sulfides, Inorganic	GT	GF	H _F	GT	GT		H		E				
34	Epoxydes	H _P	H _P	H _P	H _P	U		H _P	H _P	H _P	H _P	U		
101	Combustible and Flammable Materials, Miscellaneous	H _G	H _F	GT										
102	Explosives	H _E	H _E	H _E					H _E		H _E			H _E
103	Polymerizable Compounds	H _P	H _P	H _P					H _P	H _P	H _P	U		
104	Oxidizing Agents, Strong	H _{GT}	H _{GT}	H _F	H _F	H _F	GT	GT	H _E	H _F	GT		H _E	H _F
105	Reducing Agents, Strong	H _{GF}	H _F	GT	H _{GF}	H _F	GF	H _G	H _G				H _{GT}	H _F
106	Water and Mixtures Containing Water	H	H						G					
107	Water Reactive Substances	← EXTREMELY REACTIVE! →												
		1	2	3	4	5	6	7	8	9	10	11	12	13

Figure 6. Hazardous waste compatibility chart.

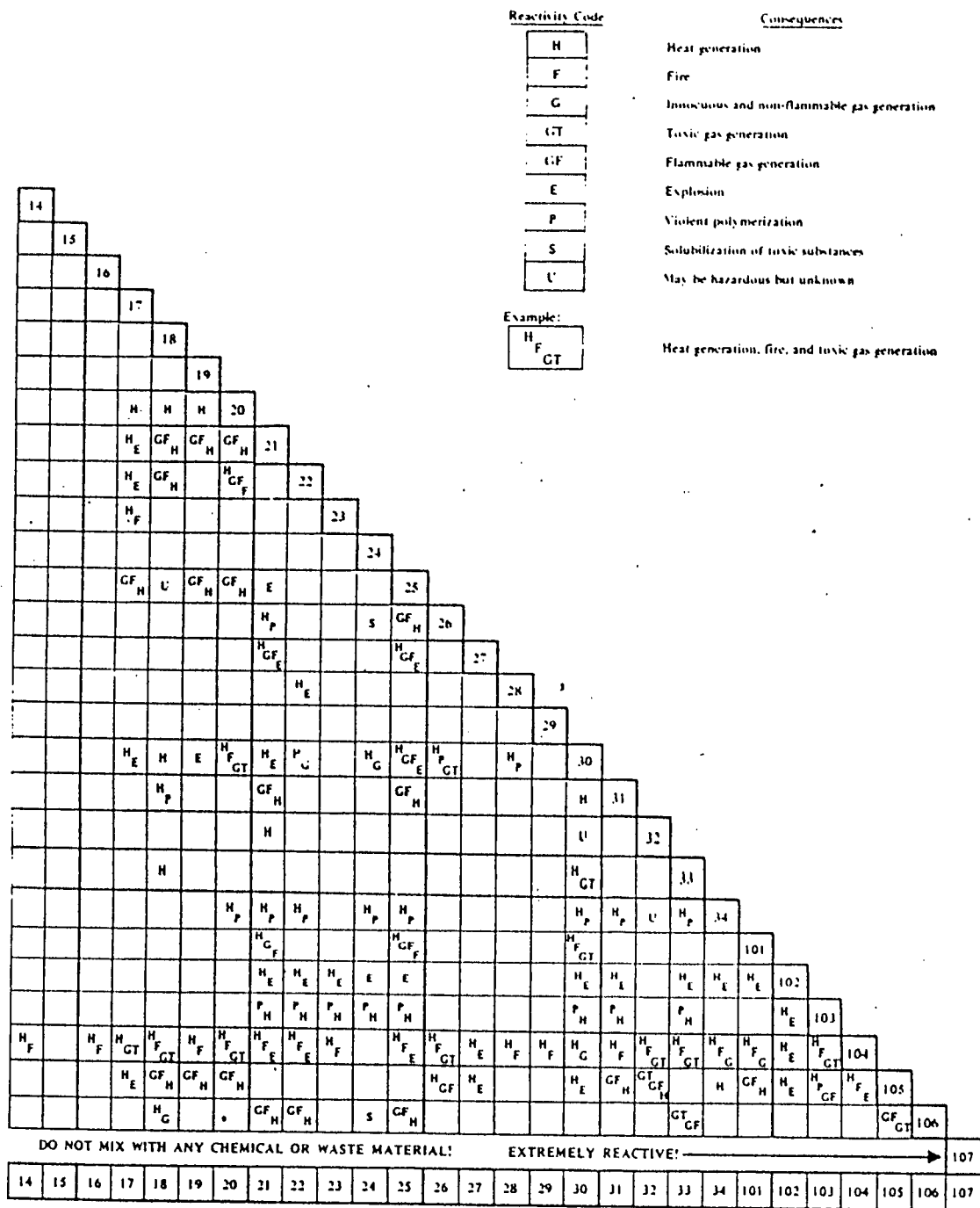


Figure 6. Hazardous waste compatibility chart (continued).

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APPENDICES

APPENDIX I. LIST OF CHEMICAL SUBSTANCES

This appendix lists the chemical substances that may be found in hazardous wastestreams. The list is not inclusive but represents the data compiled through a literature survey and examination of hazardous waste management practices.

The list consists of three columns. The first column lists the chemical or trade names in alphabetical order. The trade names are denoted by asterisks (*). The second column lists the synonyms or common names of the chemical substances when available. The third column lists the reactivity group numbers (RGN) assigned to the substances as derived in Appendix 2. A compound may be assigned more than one RGN.

This appendix is used to obtain the RGN of waste constituents when known specifically. The RGN is used to determine the compatibility of the combinations of wastes according to the compatibility method in Section 4.

The chemical substances listed were compiled from several sources. The list of Hazardous Wastes and Hazardous Materials and List of Extremely Hazardous Wastes and Extremely Hazardous Materials in California's Industrial Waste Law of 1972 (Ref. 44) served as the starting reference. The primary sources of information consisted of published reports (Ref. 1, 7, 12, 13, 14, 32, and 52) identifying the hazardous chemical substances in industrial wastestreams. Additional chemical entries were abstracted from the California Waste Haulers Record files (Ref. 10), California Extremely Hazardous Waste Disposal Permit files (Ref. 8), and the TRW Systems' report on recommended methods of reduction, neutralization, recovery, and disposal of hazardous wastes (Ref. 77).

<u>Names</u>	<u>Synonyms</u>	<u>RGN</u>
Abate*		32
Acenaphthene		16
Acetamide		6
Acetaldehyde		5
Acetic acid		3
Acetic anhydride		107
Acetone	Dimethyl ketone	19
Acetone cyanohydrin	Hydroxyisobutyronitrile	4, 26
Acetonitrile	Methyl cyanide	26
Acetophenone		19
Acetoxybutane	Butyl acetate	13
Acetoxypentane	Amyl acetate	13
Acetyl acetone		19

<u>Names</u>	<u>Synonyms</u>	<u>RGN</u>
Acetyl azide		102
Acetyl benzoyl peroxide		30
Acetyl bromide		17, 107
Acetyl chloride		17, 107
Acetylene		28
Acetyl nitrate		27, 102
Acetyl peroxide		30
Acrolein	Aqualin	5, 103
Acrylic acid		3, 103
Acrylonitrile		26, 103
Adipic acid		3
Adiponitrile		26
Agallol	Methoxyethylmercuric chloride	24
Agaloaretan	Methoxymethylmercuric chloride	24
Aldicarb	Temik*	9, 20
Aldrin		17
Alkyl aluminum chloride		107
Alkyl resins		101
Allene		28
Allyl alcohol	2-Propen-1-ol	4
Allyl bromide	Bromopropene	17
Allyl chloride	Chloropropene	17
Allyl chlorocarbonate	Allyl chloroformate	13, 17
Allyl chloroformate	Allyl chlorocarbonate	13, 17
Allyl trichlorosilane		107
Aluminum		22, 23
Aluminum aminoborohydride		107
Aluminum borohydride		105, 107
Aluminum bromide		107
Aluminum carbide		105
Aluminum chloride		107
Aluminum diethyl monochloride	Diethylaluminum chloride	105, 107
Aluminum fluoride		15, 107
Aluminum hydride		105
Aluminum hypophosphide		107
Aluminum phosphide		107
Aluminum tetraazidoborate		8
Aminobenzene	Aniline	7
Aminobutane	Butylamine	7
Aminochlorotoluene	Chlorotoluidine	7, 17
Aminodiphenyl		7
Aminoethane	Ethylamine	7
Aminoethanol		4, 7
Aminoethanolamine		7
Aminohexane	Hexylamine	7
Aminomethane	Methylamine	7
Aminopentane	Amylamine	7
Aminophenol		7, 31

<u>Names</u>	<u>Synonyms</u>	<u>RGN</u>
Aminopropane	Isopropyl amine	7
Amino propionitrile		7, 26
Aminothiazole		7, 8
Aminotoluene	Toluidine	7
Ammonia		10
Ammonium arsenate		24
Ammonium azide		102
Ammonium bifluoride		15
Ammonium chlorate		102, 104
Ammonium dichromate		24, 102
Ammonium fluoride		15
Ammonium hexanitrocobaltate		24, 102
Ammonium hydroxide		10
Ammonium hypophosphide		105
Ammonium molybdate		24
Ammonium nitrate		102
Ammonium nitridoosmate		24, 104
Ammonium nitrite		102
Ammonium perchlorate		104
Ammonium periodate		102, 104
Ammonium permanganate		24, 102, 104
Ammonium persulfate		104
Ammonium picrate		102
Ammonium sulfide		33, 105
Ammonium tetrachromate		24, 104
Ammonium tetraperoxychromate		24, 102, 104
Ammonium trichromate		24, 104
Amyl acetate	Acetoxy pentane	13
Amyl alcohol		4
Amyl chloride	Chloropentane	17
Amyl cyanide		26
Amylamine	Aminopentane	7
Amylene	Pentene	28
Amyl mercaptan	Pentanethiol	20
Aniline		7
Animert* V-101	Tetrasul	20
Anisole		14
Anisole chloride		107
Anthracene		16
Antimony		23, 24
Antimony chloride	Antimony trichloride	24, 107
Antimony fluoride	Antimony trifluoride	24, 107
Antimony nitride		24, 25
Antimony oxychloride		24
Antimony oxide	Antimony trioxide	24
Antimony pentachloride		24
Antimony pentafluoride		24
Antimony pentasulfide		24, 33, 105
Antimony perchlorate		24, 104
Antimony potassium tartrate		24

<u>Names</u>	<u>Synonyms</u>	<u>RGN</u>
Antimony sulfate	Antimony trisulfate	24
Antimony sulfide	Antimony trisulfide	24, 33, 105
Antimony tribromide		24, 107
Antimony trichloride	Antimony chloride	24, 107
Antimony trifluoride	Antimony fluoride	24, 107
Antimony triiodide		24, 107
Antimony trioxide	Antimony oxide	24
Antimony trisulfate	Antimony sulfate	24
Antimony trisulfide	Antimony sulfide	24, 33
Antimony trivinyl		24, 107
Aqualin	Acrolein	5, 103
Aqueous solutions & mixtures		106
Aretan*	Methoxyethylmercuric chloride	24
Aroclor*	Polychlorinated biphenyl	17
Arsenic		24
Arsenic bromide	Arsenic tribromide	24, 107
Arsenic chloride	Arsenic trichloride	24, 107
Arsenic disulfide	Arsenic sulfide	24, 33, 105
Arsenic iodide	Arsenic triiodide	24, 107
Arsenic oxide	Arsenic pentoxide	24
Arsenic pentaselenide		24
Arsenic pentasulfide		24, 33
Arsenic pentoxide	Arsenic oxide	24
Arsenic sulfide	Arsenic disulfide	24, 33, 105
Arsenic tribromide	Arsenic bromide	24, 107
Arsenic trichloride	Arsenic chloride	24, 107
Arsenic trifluoride		24
Arsenic triiodide	Arsenic iodide	24, 107
Arsenic trisulfide		24, 33, 105
Arsine		24, 105
Askarel	Polychlorinated biphenyl	17
Asphalt		101
Azidocarbonyl guanidine		8, 102
Azido-s-triazole		8
Azinphos ethyl		32
Aziridine	Ethyleneimine	7, 103
a,a'-Azodiisobutyronitrile		8, 26
Azodrin*	Monocrotophos	32
Bakelite*		101
Banol	Carbanolate	9
Barium		21, 24, 107
Barium azide		24, 102
Barium bromate		24, 104
Barium carbide		24, 105, 107
Barium chlorate		24, 104
Barium chloride		24
Barium chromate		24, 104
Barium fluoride		15, 24
Barium fluosilicate		24

<u>Names</u>	<u>Synonyms</u>	<u>RGN</u>
Barium hydride		24, 105
Barium hydroxide		10, 24
Barium hypophosphide		24, 105
Barium iodate		24, 104
Barium iodide		24
Barium monoxide	Barium oxide	10, 24, 107
Barium nitrate		24, 104
Barium oxide	Barium monoxide	10, 24, 107
Barium perchlorate		24, 104
Barium permanganate		24, 104
Barium peroxide		24, 104
Barium phosphate		24
Barium stearate		24
Barium sulfide		24, 33, 105, 107
Barium sulfite		24
Bassa*	BPMC	9
Bayer 25141	Fensulfothion	32
Baygon*		9
Benzadox	Topcide*	6
Benzal bromide		17
Benzal chloride		17
Benzaldehyde		5
Benz-a-pyrene		16
Benzene		16
Benzene diazonium chloride		8, 102
Benzene phosphorus dichloride		107
Benzidine		7
Benzoic acid		3
Benzonitrile		26
Benzophenone		19
Benzoquinone	Quinone	19
Benzotriazole		8, 102
Benzotribromide		17
Benzotrichloride		17
Benzotrifluoride	Trifluoromethylbenzene	17
Benzoyl chloride		107
Benzoyl peroxide	Dibenzoyl peroxide	30, 102
Benzyl alcohol		4
Benzylamine		7
Benzyl benzene	Diphenylmethane	16
Benzyl bromide	Bromotoluene	17
Benzyl chloride	Chlorotoluene	17
Benzyl chlorocarbonate	Benzyl chloroformate	17
Benzyl chloroformate	Benzyl chlorocarbonate	17
Benzyl silane		105, 107
Benzyl sodium		105
Beryllium		24
Beryllium copper alloy		24
Beryllium fluoride		15, 24
Beryllium hydride		24, 105, 107

<u>Names</u>	<u>Synonyms</u>	<u>RGN</u>
Beryllium hydroxide		10, 24
Beryllium oxide		24
Beryllium sulfide		33, 105
Beryllium tetrahydroborate		24, 105, 107
Bidrin*		32
Bismuth		22, 23, 24
Bismuth chromate		24
Bismuthic acid		24
Bismuth nitride		24, 25, 102
Bismuth pentafluoride		24, 107
Bismuth pentaoxide		24
Bismuth sulfide		24, 33, 105
Bismuth tribromide		24
Bismuth trichloride		24
Bismuth triiodide		24
Bismuth trioxide		24
Bismuth trisulfide		24, 33, 105
Blada-fum*	Sulfotepp	32
Blue vitriol	Copper sulfate	24
Bomyl		32
Borane		24, 107
Bordeaux arsenites		24
Boric acid		1
Boron arsenotribromide		24, 105
Boron bromodiodide		24, 107
Boron dibromiodide		24, 107
Boron nitride		24, 25
Boron phosphide		24, 107
Boron triazide		24, 102
Boron tribromide		24, 107
Boron trichloride		24, 107
Boron trifluoride		24, 107
Boron triiodide		24, 107
Boron trisulfide		24, 33, 105
BPMC	Bassa*	9
Brass		23
Bromic acid		2
Bromine		104
Bromine azide		102
Bromine cyanide	Cyanogen bromide	11
Bromine monofluoride		104, 107
Bromine pentafluoride		104, 107
Bromine trifluoride		104, 107
Bromoacetylene		17
Bromobenzoyl acetanilide		6, 19
Bromobenzyl trifluoride		17
Bromodiborane		105
Bromodiethylaluminum		107
Bromodimethoxyaniline		14
Bromoform	Tribromomethane	17

<u>Names</u>	<u>Synonyms</u>	<u>RGN</u>
Bromomethane	Methyl bromide	17
Bromophenol		17, 31
Bromopropene	Allyl bromide	17
Bromopropyne		17
Bromosilane		105
Bromotoluene	Benzyl bromide	17
Bromotrichloromethane		17
Bromotrifluoromethane		17
Bromoxynil	3,5-Dibromo-4-hydroxy benzonitrile	17, 26, 31
Bronze		23
Buna-N*		101
Bunker fuel oil		101
Butacarb		9
Butadiene		28, 103
Butadiyne	Diacetylene	28
Butanal	Butyraldehyde	5
Butane		29
Butanediol		4
Butanethiol	Butyl mercaptan	20
Butanetriol trinitrate		102
Butanol	Butyl alcohol	4
Butanone	Methyl ethyl ketone	19
Butenal	Crotonaldehyde	5
Butene		28
Butene-2-one	Methyl vinyl ketone	19
Butyl acetate	Acetoxybutane	13
n-Butyl acrylate		13, 103
Butylamine	Aminobutane	7
Butyl alcohol	Butanol	4
t-Butyl azidoformate		8
Butyl benzene	Phenylbutane	16
Butyl benzyl phthalate		13
Butyl cellusolve*		4
Butyl dichloroborane		105
Butyl ether	Dibutyl ether	14
Butyl formate		13
Butyl fluoride		17
Butyl glycidyl ether		34
Butyl hydroperoxide		30
t-Butyl hypochlorite		102, 104
n-Butyl lithium		105, 107
Butyl mercaptan	Butanethiol	20
Butyl peroxide		30
Butyl peroxyacetate	t-Butyl perbenzoate	30
Butyl peroxybenzoate		30
Butyl peroxy-pivalate		30
t-Butyl perbenzoate	Butyl peroxyacetate	30
t-Butyl-3-phenyl oxazirane		34
Butyl trichlorosilane		107

<u>Names</u>	<u>Synonyms</u>	<u>RGN</u>
Butyramide		6
Butyraldehyde	Butanol	5
Butyric acid		3
Butyronitrile		26
Bux*		9
Cacodylic acid	Dimethylarsenic acid	24
Cadmium		23, 24
Cadmium acetylde		24, 105, 107
Cadmium amide		24, 10, 107
Cadmium azide		24, 102
Cadmium bromide		24
Cadmium chlorate		24, 104
Cadmium chloride		24
Cadmium cyanide		11, 24
Cadmium fluoride		15, 24
Cadmium hexamine chlorate		24, 102
Cadmium hexamine perchlorate		24, 102
Cadmium iodide		24
Cadmium nitrate		24, 102, 104
Cadmium nitride		24, 25, 102
Cadmium oxide		24
Cadmium phosphate		24
Cadmium sulfide		24, 33, 105
Cadmium trihydrazine chlorate		24, 102
Cadmium trihydrazine perchlorate		24, 102
Calcium		24, 102
Calcium arsenate		24
Calcium arsenite		24
Calcium bromate		104
Calcium carbide		105, 107
Calcium chlorate		104
Calcium chlorite		104
Calcium fluoride		15
Calcium hexammoniate		105
Calcium hydride		105, 107
Calcium hydroxide	Hydrated lime	10
Calcium hypochlorite	Calcium oxychloride	104
Calcium hypophosphide		105
Calcium iodate		104
Calcium-manganese-silicon alloy		23
Calcium nitrate	Lime nitrate, nitrocalcite	104
Calcium oxide	Slaked lime	10, 107
Calcium oxychloride	Calcium hypochlorite	104
Calcium perchromate		104
Calcium permanganate		104
Calcium peroxide		104
Calcium phosphide		107
Calcium sulfide		33, 105
Camphor oil		101
Capric acid		3

<u>Names</u>	<u>Synonyms</u>	<u>RGN</u>
Caproic acid	Hexanoic acid	3
Caprylic acid		3
Caprylyl peroxide	Octyl peroxide	30
Carbacrol		31
Carbaryl		9
Carbetamide		6
Carbanolate	Banol	9
Carbofuran	Furadan*	9
Carbolic acid	Phenol	31
Carbolic oil		31
Carbon, activated, spent		101
Carbon bisulfide	Carbon disulfide	20
Carbon disulfide	Carbon bisulfide	20
Carbon tetrachloride	Tetrachloromethane	17
Carbon tetrafluoride		17
Carbon tetraiodide		17
Castrix	Crimidine	7
Catechol		31
Caustic potash	Potassium hydroxide	10
Caustic soda	Sodium hydroxide	10
CDEC		12
Cellulose		101
Cellulose nitrate	Nitro cellulose	27, 102
Cerium		22
Cerium hydride		105
Cerium trisulfide		33, 105
Cerous phosphide		105
Cesium		21
Cesium amide		107
Cesium azide		102
Cesium carbide		105
Cesium fluoride		15
Cesium hexahydroaluminate		105
Cesium hydride		105, 107
Cesium phosphide		107
Cesium sulfide		33, 105
Chloral hydrate	Trichloroacetaldehyde	5
Chlordane		17
Chlorestol	Polychlorinated biphenyl	17
Chlorfenvinphos		32
Chloric acid		2, 104
Chlorine		104
Chlorine azide		102
Chlorine dioxide		102, 104, 107
Chlorine fluoroxide		102, 104
Chlorine monofluoride		104, 107
Chlorine monoxide		104
Chlorine pentafluoride		104, 107
Chlorine trifluoride		104, 107
Chlorine trioxide		102, 104

<u>Names</u>	<u>Synonyms</u>	<u>RGN</u>
Chloroacetaldehyde		5, 17
Chloroacetic acid	Monochloroacetic acid	3, 17
Chloroacetone	Monochloroacetone	17, 19
Chloroacetophenone	Phenyl chloromethyl ketone	17, 19
Chloroacetyl chloride		107
Chloroacetylene		102
Chloroacrylonitrile		17, 26
Chloroazodin		8, 17
Chlorobenzene		17
Chlorobenzotriazole		8, 17
Chlorobenzoyl peroxide		17, 30
Chlorobenzylidene malononitrile		17, 26
Chlorobutyronitrile		17, 26
Chloro chromic anhydride	Chromyl chloride	24, 104, 107
Chlorocreosol		17, 31
Chlorodiborane		105
Chlorodiisobutyl aluminum		105, 107
Chlorodimethylamine diborane		105
Chlorodinitrobenzene	Dinitrochlorobenzene	17, 27
Chloro dinitrotoluene		17, 27
Chlorodipropyl borane		105
Chloroethane	Ethyl chloride	17
Chloroethanol		4, 7
Chloroethylenimine		17
Chloroform	Trichloromethane	17
Chlorohydrin		17
Chloromethane	Methyl chloride	17
Chloromethyl methyl ether		17
Chloromethyl phenoxyacetic acid		3, 17
Chloronitroaniline		17, 27
Chloronitrobenzene	Nitrochlorobenzene	17, 27
Chloropentane	Amyl chloride	17
Chlorophenol		31
Chlorophenyl isocyanate		17, 18, 107
Chloropicrin	Chlorpicrin, Trichloronitromethane	17, 27, 102
Chloropropane	Isopropyl chloride	17
Chloropropene	Allyl chloride	17
Chloropropylene oxide	Epichlorohydrin	17, 34
Chlorosilane		105
Chlorosulfonic acid		1
Chlorothion*		17, 32
Chlorotoluene	Benzyl chloride	17
Chlorotoluidine		7, 17
Chlorotrinitrobenzene	Picryl chloride	17, 27, 102
β -Chlorovinyl dichloroarsine	Lewisite	24
Chlorpicrin	Trichloronitromethane	17, 27, 102
Chromic acid	Chromic anhydride, Chromium trioxide	2, 24, 104

<u>Names</u>	<u>Synonyms</u>	<u>RGN</u>
Chromic anyhdride	Chromium trioxide, Chromic acid	2, 24, 104
Chromic chloride	Chromium trichloride	24
Chromic fluoride	Chromium trifluoride	15, 24
Chromic oxide		24
Chromic sulfate	Chromium sulfate	24
Chromium		23, 24
Chromium sulfate	Chromic sulfate	24
Chromic sulfide		24, 33, 105
Chromium trichloride	Chromic chloride	24
Chromium trifluoride	Chromic fluoride	15, 24
Chromium trioxide	Chromic acid, Chromic anhydride	2, 24, 104
Chromyl chloride	Chloro chromic anhydride	24, 104, 107
Chrysene		16
CMME	Methyl chloromethyl ether	14, 17
Coal oil		101
Coal tar		31
Cobalt		22, 23, 24
Cobalt bromide	Cobaltous bromide	24
Cobalt chloride	Cobaltous chloride	24
Cobalt nitrate	Cobaltous nitrate	24, 104
Cobaltous bromide	Cobalt bromide	24
Cobaltous chloride	Cobalt chloride	24
Cobaltous nitrate	Cobalt nitrate	24, 104
Cobaltous resinate	Cobalt resinate	24
Cobaltous sulfate	Cobalt sulfate	24
Cobalt resinate	Cobaltous resinate	24
Cobalt sulfate	Cobaltous sulfate	24
Collodion	Pyroxylin	27
Copper		23, 24
Copper acetoarsenite	Paris Green	24
Copper acetylide		24, 102, 105, 107
Copper arsenate	Cupric arsenate	24
Copper arsenite	Cupric arsenite	24
Copper chloride	Cupric chloride	24
Copper chlorotetrazole		24
Copper cyanide	Cupric cyanide	11, 24
Copper nitrate	Cupric nitrate	24, 104
Copper nitride		24, 25
Copper sulfate	Cupric sulfate, Blue vitriol	24
Copper sulfide		24, 33, 105
Compound 1836	Diethyl chlorvinyl phosphate	17, 32
Coroxon*		32
Coumafuryl	Fumarin	19
Coumatetralyl		19
Cresol		31
Cresol glydicyl ether		34
Cresote		31
Crimidine	Castrix	7

<u>Names</u>	<u>Synonyms</u>	<u>RGN</u>
Crotonaldehyde	Butenal	5
Crotyl alcohol		4
Crotyl bromide		17
Crotyl chloride		17
Cumene	Isopropyl benzene	16
Cumene hydroperoxide	Dimethylbenzyl hydroperoxide	30
Cupric arsenate	Copper arsenate	24
Cupric arsenite	Copper arsenite	24
Cupric chloride	Copper chloride	24
Cupric cyanide	Copper cyanide	11, 24
Cupric nitrate	Copper nitrate	24, 104
Cupric sulfate	Copper sulfate	24
Cupriethylenediamine		7, 24
Cyanoacetic acid	Malonic nitrile	3, 26
Cyanochloropentane		17, 26
Cyanogen		26
Cyanogen bromide	Bromine cyanide	11
Cyanophenphos	Surecide*	26, 32
Cyanuric triazide		102
Cycloheptane		29
Cyclohexane		29
Cyclohexanol		4
Cyclohexanone		19
Cyclohexanone peroxide		30
Cyclohexylamine		7
Cyclohexenyl trichlorosilane		107
Cyclohexyl phenol		31
Cyclohexyl trichlorosilane		107
Cyclopentane		29
Cyclopentanol		4
Cyclopentene		28
Cyclopropane		29
Cyclotrimethylene trinitraamine	RDX	27, 102
Cymene		16
Cyolan*	Phospholan	20, 32
2,4-D	Dichlorophenoxyacetic acid	3, 17
Dasanit*	Fensulfothion	32
DBCP	Dibromochloropropane	17
DCB	Dichlorobenzene	17
DDD		17
DDNP	Diazodinitrophenol	8, 27, 102
DDT		17
DDVP	Dichlorovos, Vapona*	17, 32
DEAC	Diethylaluminum chloride	105, 107
Decaborane		107
Decahydronaphthalene	Decalin	29
Decalin	Decahydronaphthalene	29
Decane		29
Decanol		4
Decene		28

<u>Names</u>	<u>Synonyms</u>	<u>RGN</u>
Decyl benzene		16
Delnav*		32
Demeton-s-methyl sulfoxid	Dioxathion	32
Diacetone alcohol	Metasystox R*	4, 19
Diacetyl		19
Diacetylene	Butadiyne	28
Diamine	Hydrazine	8, 105
Diaminobenzene	Phenylene diamine	7
Diaminohexane	Hexamethylenediamine	7
Diazidoethane		8, 102
Diazinon*		32
Diazodinitrophenol	DDNP	27, 102
Dibenzoyl peroxide	Benzoyl peroxide	30, 102
Diborane	Diboron hexahydride	105, 107
Diboron hexahydride	Diborane	105, 107
Dibutyl ether	Butyl ether	14
Dibutyl phthalate		13
3,5-Dibromo-4-hydroxybenzonitrile	Bromoxynil	17, 26, 31
Dibromochloropropane	DBCP, Fumazone*, Nemagon*	17
Dibromoethane	Ethylene dibromide	17
Dichloroacetone		17, 19
Dichloroamine		104
Dichlororobenzene	DCB	17
Dichlorobenzidine		7, 17
Dichlorodimethylsilane	Dimethyl dichlorosilane	107
Dichloroethane	Ethylene dichloride	17
Dichloroethene	Dichloroethylene	17
Dichloroether	Dichloroethyl ether	14, 17
Dichloroethylarsine		24, 107
Ethyl dichlorosilane		107
Ethyl ether	Dichloroether	14, 17
Dichloroisocyanuric acid	Dichloro-s-triazine-2,4,5-trione	104
Dichloromethane	Methylene chloride	17
Dichlorophene		17
Dichlorophenol		17, 31
Dichlorophenoxyacetic acid	2,4-D	3, 17
Dichloropropane	Propylene dichloride	17
Dichloropropanol		4, 17
Dichloropropene	Dichloropropylene	17
Dichloropropylene	Dichloropropene	17
Dichloro-s-triazine-2,4,5-trione	Dichloroisocyanuric acid	104
Dichlorovos	DDVP	17, 32
Dicumyl peroxide		30
Dicyclopentadiene		28
Dieldrin		17
Diethanolamine		4, 7
Diethyl aluminum chloride	Aluminum diethylmonochloride, DEAL	105, 107
Diethylamine		7
Diethyl benzene		16

<u>Names</u>	<u>Synonyms</u>	<u>RGN</u>
Diethyl chlorovinyl phosphate	Compound 1836	17, 32
Diethyl dichlorosilane		107
Diethylene dioxide	Dioxane	14
Diethylene glycol dinitrate		27, 102
Diethylene glycol monobutyl ether acetate		13
Diethylene triamine		7
Diethyl ether		14
Diethyl ketone		19
Diethyltoluamide		6
Diethyl zinc	Zinc ethyl	24, 105, 107
Diesel oil		101
Difluorophosphoric acid		1
Diglycidyl ether	Bis(2,3-epoxypropyl) ether	34
Diisobutylene		28
Diisobutyl ketone		19
Diisopropanolamine		4, 17
Diisopropylbenzene hydroperoxide		30
Diisopropyl beryllium		24, 104, 107
Diisopropyl ether	Isopropyl ether	14
Diisopropyl peroxydicarbonate	Isopropyl percarbonate	30
Dimecron*	Phosphamidon	32
Dimefox	Hanane*	6, 32
Dimethyl acetylene		28
Dimethyl amine		7
Dimethylamino azobenzene	Methyl yellow	7, 8
Dimethyl arsenic acid	Cacodylic acid	24
Dimethylbenzyl hydroperoxide	Cumene hydroperoxide	30
Dimethyl butane	Neohexane	29
Dimethyl butyne		28
Dimethyl dichlorosilane	Dichlorodimethylsilane	107
Dimethyldithiophosphoric acid		32
Dimethyl ether		14
Dimethyl formal		19
Dimethyl formamide		6
Dimethylhexane dihydroperoxide		30
Dimethyl hydrazine	UDMH	8
Dimethyl ketone	Acetone	19
Dimethyl magnesium		105, 107
Dimethylnitrobenzene	Nitroxylenes	27
Dimethylnitrosoamine	N-Nitrosodimethyl amine	7, 27
Dimethyl sulfide	Methyl sulfide	20
Dimeton		32
Dinitrobenzene		27
Dinitrochlorobenzene	Chlorodinitrobenzene	17, 27
2,4-Dinitro-6-sec-butyl phenol	Dinoseb	27, 31
Dinitrocresol	DNOC, Elgetol 30	27, 31
Dinitrophenol		27, 31
Dinitrophenyl hydrazine		8, 27
Dinitrotoluene		27

<u>Names</u>	<u>Synonyms</u>	<u>RGN</u>
Dinoseb	2,4-Dinitro-6-sec-butylphenol	27, 31
Dioxacarb		9
Dioxane	Diethylene dioxide	14
Dioxathion	Delnav*	32
Dipentaerythritol hexanitrate		27, 102
Dipentene		28
Diphenamide		6
Diphenyl	Phenylbenzene	16
Diphenyl acetylene		16
Diphenylamine		7
Diphenylamine chloroarsine	Phenarsazine chloride	7, 24
Diphenyl ethane		16
Diphenyl ethylene	Stilbene	16
Diphenyl methane	Benzylbenzene	16
Diphenylmethane diisocyanate		18, 107
Diphenyl oxide		14
Dipicryl amine	Hexanitrodiphenylamine	7, 27, 102
Dipropyl amine		7
Disulfoton	Disyston*	32
Disulfuric acid		1
Disulfur dinitride		25, 102
Disulfuryl chloride		107
Disyston*	Disulfoton	32
Dithane* M-45		12
Dithione*	Sulfotepp	32
DNOC	Dinitrocresol	27, 31
Dodecene		28
Dodecyl benzene		16
Dodecyl trichlorosilane		107
Dowco-139*	Mexacarbate	9
Dowicide I	o-Phenyl phenol	31
Dowtherm		16
Durene		16
Dyfonate*	Fonofos	32
Dynes Thinner		101
Elgetol 30	Dinitrocresol	27, 31
Endolsulfan	Thiodan*	17, 20
Endothall		3
Endothion	Exothion	32
Endrin		17
EPN		32
Epichlorohydrin	Chloropropylene oxide	17, 34
Epoxybutane		34
Epoxybutene		34
Epoxyethane	Ethylene oxide	34, 103
Epoxyethylbenzene		34
Bis(2-3-Epoxypropyl) ether	Diglycidyl ether	34
Ethane		29
Ethanethiol	Ethyl mercaptan	20
Ethanol	Ethyl alcohol	4

<u>Names</u>	<u>Synonyms</u>	<u>RGN</u>
Ethion*	Nialate	32
Ethoxyethanol		4, 14
Ethyl acetate		13
Ethyl acetylene		28
Ethylacrylate		13, 103
Ethyl alcohol	Ethanol	4
Ethylamine	Aminoethane	7
Ethyl benzene	Phenylethane	16
Ethyl butanoate	Ethyl butyrate	13
Ethyl butyrate	Ethyl butanoate	13
Ethyl chloride	Chloroethane	17
Ethyl chloroformate		13, 17
Ethyl dichloroarsine	Dichloroethylarsine	24, 107
Ethyl dichlorosilane		107
Ethyl ether	Diethyl ether	14
Ethylene		28
Ethylene chromic oxide		24, 104
Ethylene chlorohydrin		4, 17
Ethylene cyanohydrin	Hydroxypropionitrile	4, 26
Ethylene diamine		7
Ethylene dibromide	Dibromoethane	17
Ethylene dichloride	Dichloroethane	17
Ethylene glycol		4
Ethylene glycol dinitrate	Glycol dinitrate	27, 102
Ethylene glycol monomethyl ether		4, 14, 17
Ethyleneimine	Aziridine	7, 103
Ethylene oxide	Epoxyethane	34, 103
Ethyl formate		13
2-Ethylhexyl acrylate		13, 103
Ethyl mercaptan	Ethanethiol	20
Ethyl nitrate		27, 102
Ethyl nitrite		27, 102
Ethyl propionate		13
Ethyl trichlorosilane		107
Exothion	Endothion	32
Eugenol		31
Fensulfothion	Bayer 25141, Dasanit*	32
Ferbam		12
Ferric arsenate		24
Ferric sulfide		33
Ferrous arsenate	Iron arsenate	24
Ferrous sulfide		33, 105
Fluoranthrene		16
Fluorene		16
Fluorine		104, 107
Fluorine azide		102
Fluorine monoxide	Oxygen difluoride	104, 107
Fluoroacetanilide		6, 17
Fluoroacetic acid		3
Fluoroboric acid		1, 15

<u>Names</u>	<u>Synonyms</u>	<u>RGN</u>
Fluorosulfonic acid	Fluosulfonic acid	1, 107
Fluosulfonic acid	Fluosulfonic acid	1, 107
Fluosilicic acid		1, 15
Fonofos*	Dyfonate*	32
Formaldehyde	Methanal	5
Formamide		6
Formetanate hydrochloride		6
Formic acid	Methanoic acid	3
Fostion*	Prothoate	32
Freon*		17
Fumaric acid		3
Fumarin	Coumafuryl	19
Fumazone*	Dibromochloropropane	17
Furadan*	Carbofuran	9
Furan	Furfuran	14
Furfural		5
Furfuran		14
Gas oil, cracked		101
Gasoline		101
Germanium sulfide		33, 105
Glutaraldehyde		5
Glycerin		4
Glycidol		34
Glycol diacetate		13
Glycol dinitrate	Ethylene glycol dinitrate	27, 102
Glycol ether		14
Glycolic acid		3
Glycol monolactate trinitrate		27, 102
Glycolonitrile		26
Gold acetylde		105, 107
Gold cyanate	Gold fulminate	102
Gold fulminate	Gold cyanate	102
Gold sulfide		33, 105
Grease		101
Guaiacol		31
Guanyl nitrosaminoguanilydene hydrazine		8, 102
Guanidine nitrate		27, 104
Gun cotton	Nitrocellulose	27, 102
Guthion*		32
Hafnium		22
Hanane*	Dimefox	6, 32
Hemimellitene		16
Heptachlor		17
Heptane		29
Heptanal		5
Heptanol		4
Heptanone		19
Heptene		28
Hexaborane		105
Hexachlorobenzene		17

<u>Names</u>	<u>Synonyms</u>	<u>RGN</u>
Hexadecyl trichorosilane		107
Hexaethyl tetraphosphate		32
Hexafluorophosphoric acid		1, 15
Hexahydride diborane	Diborane	105, 107
Hexamethyl benzene		16
Hexamethylenediamine	Diaminohexane	7
Hexamethylenetetraamine		7
Hexanal		5
Hexanitrodiphenylamine	Dipicrylamine	7, 27, 102
Hexanol		4
Hexanoic acid	Caproic acid	3
Hexene		28
Hexylamine	Aminohexane	7
Hexyl trichlorosilane		107
Hexyne		28
HMX		102
Hopcide*		9
Hydrated lime	Calcium hydroxide	10
Hydrazine	Diamine	8, 105
Hydrazine azide		8, 102
Hydrazoic acid	Hydrogen azide	102
Hydriodic acid	Hydrogen iodide	1
Hydrobromic acid	Hydrogen bromide	1, 107
Hydrochloric acid	Muriatic acid	1
Hydrocyanic acid	Hydrogen cyanide	1, 11
Hydrofluoric acid	Hydrogen fluoride	1, 15
Hydrogen azide	Hydrazoic acid	102
Hydrogen bromide	Hydrobromic acid	1, 107
Hydrogen cyanide	Hydrocyanic acid	1, 11
Hydrogen fluoride	Hydrofluoric acid	1, 15
Hydrogen iodide	Hydroiodic acid	1
Hydrogen peroxide		104
Hydrogen phosphide	Phosphine	105
Hydrogen selenide		24, 105
Hydrogen sulfide		33, 105
Hydroquinone		31
Hydroxyacetophenone		19, 31
Hydroxydibromobenzoic acid		3, 17
Hydroxydiphenol		31
Hydroxyhydroquinone		31
Hydroxyacetophenone		19, 31
Hydroxyisobutyronitrile	Acetone cyanohydrin	4, 26
Hydroxyl amine		105
Hydroxypropionitrile	Ethylene cyanohydrin	4, 26
Hypochlorous acid		2
Indene		16
Indium		22, 23, 24
Inerteen	Polychlorinated biphenyl	17
Iodine monochloride		107
Iodine pentoxide		104

<u>Names</u>	<u>Synonyms</u>	<u>RGN</u>
Iron		23
Iron arsenate	Ferrous arsenate	24
Isobutane		29
Isobutanol		4
Isobutyl acetate		13
Isobutyl acrylate		13, 103
Isobutylene		28
Isodecyl acrylate		13
Isodurene		16
Isoeugenol		31
Isohexane		29
Isooctane	Trimethylpentane	29
Isooctene		28
Isopentane	Methylbutane	29
Isophorone		19
Isoprene	Methyl butadiene	28, 103
Isopropanol		4
Isopropyl acetate		13
Isopropyl acetylene		28
Isopropylamine	Aminopropane	7
Isopropyl benzene	Cumene	16
Isopropyl chloride	Chloropropane	17
Isopropyl ether	Diisopropyl ether	14
Isopropyl mercaptan		20
N-Isopropylmethylcarbamate		9
α-Isopropyl methylphosphoryl fluoride		17, 32
Isopropyl percarbonate	Diisopropyl peroxydicarbonate	30
Isotactic propylene		101
J-100		101
Jet oil		101
Kerosene		101
Lacquer thinner		101
Landrin*		9
Lannate*	Methomyl	9, 20
Lauroyl peroxide		30
Lead		23, 24
Lead acetate		24
Lead arsenate	Lead orthoarsenate	24
Lead arsenite		24
Lead azide		24, 102
Lead carbonate		24
Lead chlorite		24, 104
Lead cyanide		11, 24
Lead dinitroresorcinate		24, 27, 102
Lead mononitroresorcinate		24, 27, 102
Lead nitrate		24, 104
Lead orthoarsenate	Lead arsenate	24
Lead oxide		24
Lead styphnate	Lead trinitroresorcinate	24, 27, 102
Lead sulfide		24, 33, 104

<u>Names</u>	<u>Synonyms</u>	<u>RGN</u>
Lead trinitroresorcinat	Lead styphnate	24, 27, 102
Lewisite	β-Chlorovinylchloroarsine	24
Lime nitrate	Calcium nitrate	104
Lindane		17
Lithium		21, 107
Lithium aluminum hydride		105, 107
Lithium amide		10, 107
Lithium ferrosilicon		107
Lithium hydride		105, 107
Lithium hydroxide		10
Lithium hypochlorite		104
Lithium nitride		25
Lithium peroxide		104, 107
Lithium silicon		107
Lithium sulfide		33, 105
London purple		24
Lye	Sodium hydroxide	10
Magnesium		21, 22
Magnesium arsenate		24
Magnesium arsenite		24
Magnesium chlorate		104
Magnesium fluoride		15
Magnesium nitrate		104
Magnesium perchlorate		104
Magnesium peroxide		104
Magnesium sulfide		33, 105
Malathion		32
Maleic acid		3
Malonic nitrile	Cyanoacetic acid	3, 26
Maneb		12
Manganese		22, 23, 24
Manganese acetate		24
Manganese arsenate	Manganous arsenate	24
Manganese bromide	Manganous bromide	24
Manganese chloride	Manganous chloride	24
Manganese methylcyclopentadienyl- tricarbonyl		24
Manganese nitrate	Manganous nitrate	24, 104
Manganese sulfide		24, 33, 105
Manganous arsenate	Manganese arsenate	24
Manganous bromide	Manganese bromide	24
Manganous chloride	Manganese chloride	24
Manganous nitrate	Manganese nitrate	104
Mannitol hexanitrate	Nitromannite	27, 102
Matacil*		9
Mayer's reagent	Mercuric potassium iodide	24
Medinoterb acetate		13, 27
Meobal		9
Mercaptobenzothiazole		8, 20
Mercatoethanol		4, 20

<u>Names</u>	<u>Synonyms</u>	<u>RGN</u>
Mercarbam		32
Mercuric acetate		24
Mercuric ammonium chloride	Mercury ammonium chloride	24
Mercuric benzoate	Mercury benzoate	24
Mercuric bromide		24
Mercuric chloride	Mercury chloride	24
Mercuric cyanide	Mercury cyanide	11, 24
Mercuric dioxysulfate	Mercuric subsulfate	24
Mercuric iodide	Mercury iodide	24
Mercuric nitrate	Mercury nitrate	24, 104
Mercuric oleate	Mercury oleate	24
Mercuric oxide		24
Mercuric oxycyanide		11, 24, 102
Mercuric potassium iodide	Mayer's reagent	24
Mercuric salicylate	Salicylated mercury	24
Mercuric subsulfate	Mercuric dioxysulfate	24
Mercuric sulfate	Mercury sulfate	24
Mercuric sulfide		24, 33, 105
Mercuric thiocyanate	Mercury thiocyanide	24
Mercuric thiocyanide	Mercury thiocyanate	24
Mercuriol	Mercury nucleate	24
Mercurous bromide		24
Mercurous gluconate		24
Mercurous iodide		24
Mercurous nitrate		24, 104
Mercurous oxide		24
Mercurous sulfate	Mercury bisulfate	24
Mercury		24
Mercury (vapor)		22, 24
Mercury acetate	Mercuric acetate	24
Mercury ammonium chloride	Mercuric ammonium chloride	24
Mercury benzoate	Mercuric benzoate	24
Mercury bisulfate	Mercurous sulfate	24
Mercury chloride	Mercuric chloride	24
Mercury cyanide	Mercuric cyanide	11, 24
Mercury fulminate		24, 102
Mercury iodide	Mercuric iodide	24
Mercury nitrate	Mercuric nitrate	24, 104
Mercury nucleate	Mercuriol	24
Mercury oleate	Mercuric oleate	24
Mercury sulfate	Mercuric sulfate	24
Mesitylene	1,3,5-trimethylbenzene	16
Mesityl oxide		19
Mesuiol*		9
Metasystox-R	Demeton-S-methyl sulfoxid	32
Metham		12
Methanal	Formaldehyde	5
Methane		29
Methanethiol	Methyl mercaptan	20
Methanoic acid	Formic acid	3

<u>Names</u>	<u>Synonyms</u>	<u>RGN</u>
Methanol	Methyl alcohol	4
Methomyl	Lannate*	9, 20
Methoxyethylmercuric chloride	Agallolaretan*	24
Methyl acetate		13
Methyl acetone		101
Methyl acetylene	Methyl butyne	28
Methyl acrylate		13, 103
Methyl alcohol	Methanol	4
Methyl aluminum sesquibromide		105, 107
Methyl aluminum sesquichloride		105, 107
Methylamine	Aminomethane	7
Methyl amyl acetate		13
N-Methyl aniline		7
Methyl aziridine	Propyleneimine	7
Methyl benzene	Toluene	16
Methyl bromide	Bromomethane	17
Methyl butadiene	Isoprene	28, 103
Methyl butane	Isopentane	29
Methyl butene		28
Methyl butyl ether		14
Methyl t-butyl ketone		19
Methyl butyne	Isopropyl acetylene	28
Methyl butyrate		13
Methyl chloride	Chloromethane	17
Methyl chlorocarbonate	Methyl chloroformate	13, 17
Methyl chloroform		17
Methyl chloroformate	Methyl chlorocarbonate	13, 17
Methyl chloromethyl ether	CMME	14, 17
Methyl cyanide	Acetonitrile	26
Methyl cyclohexane		29
Methyl dichloroarsine		24
Methyl dichlorosilane		107
Methylene chloride	Dichloromethane	17
Methylene diisocyanate		18, 107
4,4-Methylene bis(2-chloroaniline)		7, 17
Methyl ethyl chloride		17
Methyl ethyl ether		14
Methyl ethyl ketone	Butanone	19
Methyl ethyl ketone peroxide		30
Methyl ethyl pyridine		7
Methyl formate		13
Methyl hydrazine	Monomethyl hydrazine	8
Methyl iodide		17
Methyl isobutyl ketone		19
Methyl isocyanate		18, 107
Methyl isopropenyl ketone		19
Methyl magnesium bromide		105, 107
Methyl magnesium chloride		105, 107
Methyl magnesium iodide		105, 107
Methyl mercaptan	Methanethiol	20

<u>Names</u>	<u>Synonyms</u>	<u>RGN</u>
Methyl methacrylate		13, 103
Methyl naphthalene		16
Methyl parathion		32
Methyl pentanoate	Methyl valerate	13
Methyl propionate		13
Methyl n-propyl ketone		19
Methyl styrene		28, 103
Methyl sulfide	Dimethyl sulfide	20
Methyl trichlorosilane		107
Methyl valerate	Methyl pentanoate	13
Methyl vinyl ketone	Butene-2-one	19
Methyl yellow	Dimethylamino azobenzene	7, 8
Mevinphos	Phosdrin*	32
Mexacarbate	Dowco-139*	9
Mineral spirits		101
Mintacol*	Paraoxon	32
Mipcin*		9
Mobam*		9
Mocap*		32
Molybdenum		22, 23, 24
Molybdenum anhydride	Molybdenum trioxide	24
Molybdenum sulfide		24, 33, 105
Molybdenum trioxide	Molybdenum anhydride	24
Molybdic acid		24
Monochloroacetone	Chloroacetone	17, 19
Monochloroacetic acid	Chloroacetic acid	3, 17
Monocrotophos	Azodrin*	32
Monoethanol amine		4, 7
Monofluorophosphoric acid		1
Monoisopropanolamine		4, 7
Monomethyl hydrazine	Methyl hydrazine	8
Morpholine		7
Municipal solid waste	Refuse	101
Muriatic acid	Hydrochloric acid	1
Nabam		12
Nack	Sodium-potassium alloy	21, 107
Nak	Sodium-potassium alloy	21, 107
Naptha		101
Naphthalene		16
Naphthol		31
Naphthylamine		7
Naphthyl mercaptan		20
Naphtite	Trinitronaphthalene	27, 102
Nemagon*	Dibromochloropropane	17
Neohexane	Dimethyl butane	29
4-NBP	Nitrobiphenyl	27
Niacide*		12
Nialate	Ethion	32
Nickel		22, 24
Nickel acetate		24

<u>Names</u>	<u>Synonyms</u>	<u>RGN</u>
Nickel antimonide		24, 107
Nickel arsenate	Nickelous arsenate	24
Nickel arsenite	Nickelous arsenite	24
Nickel carbonyl	Nickel tetracarbonyl	24
Nickel chloride	Nickelous chloride	24
Nickel cyanide		11, 24
Nickel nitrate	Nickelous nitrate	24, 104
Nickelous arsenate	Nickel arsenate	24
Nickelous arsenite	Nickel arsenite	24
Nickelous chloride	Nickel chloride	24
Nickelous nitrate	Nickel nitrate	24, 104
Nickel selenide		24
Nickel subsulfide		24, 33, 105
Nickel sulfate		24
Nickel tetracarbonyl	Nickel carbonyl	24
Nitraniline	Nitroaniline	7, 27
Nitric acid		2
Nitroaniline	Nitraniline	7, 27
Nitrobenzene	Nitrobenzol	27
Nitrobenzol	Nitrobenzene	27
Nitrobiphenyl	4-NBP	27
Nitrocalcium	Calcium nitrate	104
Nitrocellulose	Cellulose nitrate, gun cotton	27, 102
Nitrochlorobenzene	Chloronitrobenzene	17, 27
Nitrogen dioxide		104
Nitromannite	Mannitol hexanitrate	27, 102
Nitrogen mustard		7, 17
Nitrogen tetroxide		104
Nitroglycerin	Trinitroglycerin	27, 102
Nitrohydrochloric acid		2
Nitrophenol		27, 31
Nitropropane		27
Nitrosodimethylamine	Dimethylnitrosiamine	7, 27
Nitrosoguanidine		27, 102
Nitrostarch	Starch nitrate	27, 102
Nitroxylene	Nitroxylol, Dimethylnitrobenzene	27
Nitroxylol	Nitroxylene, Dimethylnitrobenzene	27
N-Nitrosodimethylamine	Dimethylnitrosoamine	7, 27
Nonyl phenol		31
Nonyl trichlorosilane		107
Nonane		29
Nonene		28
Nonanone		19
Nonanal		5
Nonanol		4
Octadecyl trichlorosilane		107
Octadecyne		28
Octamethylpyrophosphoramide	Schradan	6, 32
Octanal		5
Octane		29

<u>Names</u>	<u>Synonyms</u>	<u>RGN</u>
Octanone		19
Octanol		4
Octene		28
Octyl peroxide	Caprylyl peroxide	30
Octyl trichlorosilane		107
Oil of bergamot		101
Oil of vitriol	Sulfuric acid	1
Oleum	Sulfuric acid	2, 24
Orris root		101
Orthozenol	o-Phenyl phenol	31
Osmium		23, 24
Osmium amine nitrate		24, 104
Osmium amine perchlorate		24, 104
Oxamyl		9
Oxalic acid		3
Oxygen difluoride		104, 107
PCB	Polychlorinated biphenyl	17
Paper		101
Paraoxon	Mintacol*	32
Parathion		32
Paris green	Copper acetoarsenite	24
PETD	Polyram combi*	12
PETN	Pentaerythrityl tetranitrate, Pentaerythritol tetranitrate	27, 102 105
Pentaborane		17, 31
Pentachlorophenol		17, 31
Pentaerythritol tetranitrate	Pentaerythrityl tetranitrate, PETN.	27, 102
Pentamethyl benzene		16
Pentane		29
Pentanethiol	Amyl mercaptan	20
Pentanal	Valeraldehyde	5
Pentanone		19
Pentene	Amylene	28
Pentylamine		7
Pentyne		28
Peracetic acid	Peroxyacetic acid	3, 30
Perbromic acid		2
Perchloric acid		2
Perchloroethylene	Tetrachloroethylene	17
Perchloromethyl mercaptan	Trichloromethylsulfenylchloride	17, 20
Perchlorous acid		2
Perchloryl fluoride		104
Periodic acid		2
Permonosulfuric acid		1
Peroxyacetic acid	Peracetic acid	3, 30
PETD	Polyram combi*	12
Petroleum naptha		101
Petroleum oil		101
Phenanthrene		16
Phenarsazine chloride	Diphenylamine chloroarsine	7, 24

<u>Names</u>	<u>Synonyms</u>	<u>RGN</u>
Phenol	Carbolic acid	31
Phenyl acetic acid		3
Phenyl acetonitrile		26
Phenyl acetylene		16
Phenylaniline	Diphenylamine	7
Phenylbenzene	Diphenyl	16
Phenylbutane	Butylbenzene	16
Phenylchloromethyl ketone	Chloroacetophenone	17, 19
Phenyl dichloroarsine		24
Phenylene diamine	Diaminobenzene	7
Phenylethane	Ethylbenzene	16
Phenyl hydrazine hydrochloride		8
o-Phenyl phenol	Orthozenol, Dowicide 1	31
Phenyl trichlorosilane		107
Phenyl valeryl nitrile		26
Phenylpropane	Propylbenzene	16
Phloroglucinol		31
Phorate	Thimet*	32
Phosdrin*	Mevinphos	32
Phosphamidon	Dimecron*	32
Phosphine	Hydrogen phosphide	105
Phospholan	Cyolan*	20, 32
Phosphonium iodide		105, 107
Phosphoric acid		1
Phosphoric anhydride	Phosphorus pentoxide	107
Phosphoric sulfide	Phosphorus pentasulfide	33, 105, 107
Phosphorus (Amorphous red)		105, 107
Phosphorus (White-Yellow)		105
Phosphorus heptasulfide		33, 105
Phosphorus oxybromide	Phosphoryl bromide	104, 107
Phosphorus oxychloride	Phosphoryl chloride	104, 107
Phosphorus pentachloride	Phosphoric chloride	107
Phosphorus pentasulfide	Phosphoric sulfide	33, 105, 107
Phosphorus pentoxide	Phosphoric anhydride	107
Phosphorus sesquisulfide	Tetraphosphorus trisulfide	33, 105, 107
Phosphorus tribromide		107
Phosphorus trichloride		107
Phosphorus trisulfide		33, 105, 107
Phosphoryl bromide	Phosphorus oxybromide	104, 107
Phosphoryl chloride	Phosphorus oxychloride	104, 107
Phthalic acid		3
Picramide	Trinitroaniline	7, 27, 102
Picric acid	Trinitrophenol	27, 31, 102
Picridine		7
Picryl chloride	Chlorotrinitrobenzene	17, 27, 102
Piperidine		7
Pirimicarb		9
Polyglycol ether		14
Polyamide resin		101
Polybrominated biphenyl		17

<u>Names</u>	<u>Synonyms</u>	<u>RGN</u>
Polybutene		28
Polychlorinated biphenyls	PCB, Askarel, Arochlor*, Chlorextol, Inerteen	17 17
Polychlorinated triphenyls		101
Polethylene		101
Polyester resin		101
Polymeric oil		101
Polyphenyl polymethylisocyanate		18, 107
Polypropylene		28, 101
Polyram combi*	PETD	12
Polysulfide polymer		20, 101
Polystyrene		101
Polyurethane		101
Polyvinyl acetate		101
Polyvinyl chloride		101
Polyvinyl nitrate		27, 102
Potasan		32
Potassium		21, 107
Potassium acid fluoride	Potassium fluoride	15
Potassium aluminate		10
Potassium arsenate		24
Potassium arsenite		24
Potassium bifluoride	Potassium fluoride	15
Potassium bichromate	Potassium dichromate	24, 104
Potassium bromate		104
Potassium butoxide		10
Potassium cyanide		11
Potassium dichloroisocyanurate		104
Potassium dichromate	Potassium bichromate	24, 104
Potassium dinitrobenzfuroxan		27, 102
Potassium fluoride	Potassium acid fluoride	15
Potassium hydride		105, 107
Potassium hydroxide	Caustic potash	10
Potassium nitrate	Saltpeter	102, 104
Potassium nitride		25
Potassium nitrite		104
Potassium oxide		107
Potassium perchlorate		104
Potassium permanganate		24, 104
Potassium peroxide		104, 107
Potassium sulfide		33, 105
Promecarb		9
Propanal	Propionaldehyde	5
Propane		29
Propanethiol	Propyl mercaptan	20
Propanoic acid	Propionic acid	3
Propanol	Propyl alcohol	4
Propargyl bromide		17
Propargyl chloride		17
2-Propen-1-ol	Allyl alcohol	4

<u>Names</u>	<u>Synonyms</u>	<u>RGN</u>
Propiolactone		13
Propionaldehyde	Propanal	5
Propionamide		6
Propionic acid	Propanoic acid	3
Propionitrile		26
Propyl acetate		13
Propyl alcohol	Propanol	4
Propylamine		7
Propyl benzene	Phenyl propane	16
Propylene dichloride	Dichloropropane	17
Propylene glycol		4
Propylene glycol monomethyl ether		4, 14
Propylene oxide		34, 103
Propyleneimine	Methyl aziridine	7
Propyl ether		14
Propyl formate		13
Propyl mercaptan	Propanethiol	20
Propyl Trichlorosilane		107
Prothoate	Fostion*	32
Pseudocumene	1,2,4 trimethylbenzene	16
Pyridine		7
Pyrogallol		31
Pyrosulfuryl chloride	Disulfuryl chloride	107
Pyroxylin	Collodion	27
Quinone	Benzoquinone	19
Raney nickel		22
RDX	Cyclotrimethylene trinitramine	27, 102
Refuse	Municipal solid waste	101
Resins		101
Resorcinol		31
Rubidium		21
Salicylated mercury	Mercuric salicylate	24
Saligenin		31
Saltpeter	Potassium nitrate	102, 104
Schradan	Octamethyl pyrophosphoramide, OMPA	6, 32
Selenious acid	Selenous acid	1, 24
Selenium		22, 23, 24
Selenium diethyldithiocarbamate		12, 24
Selenium fluoride		15, 24
Selenous acid	Selenious acid	1, 24
Silicochloroform	Trichlorosilane	107
Silicon tetrachloride		107
Silicon tetrafluoride		15, 107
Silver acetylde		24, 102, 105, 107
Silver azide		24, 102
Silver cyanide		11, 24
Silver nitrate		24, 104
Silver nitride		24, 25, 102
Silver styphnate	Silver trinitroresorcinate	24, 27, 102

<u>Names</u>	<u>Synonyms</u>	<u>RGN</u>
Silver sulfide		24, 33, 105
Silver tetrazene		24, 102
Silver trinitroresorcinate	Silver styphnate	24, 27, 102
Slaked lime	Calcium oxide	10, 107
Smokeless powder		102
Sodamide	Sodium amide	10, 107
Soda niter	Sodium nitrate	104
Sodium		21, 105, 107
Sodium acid fluoride	Sodium fluoride	15
Sodium aluminate		10, 105
Sodium aluminum hydride		105, 107
Sodium amide	Sodamide	10, 107
Sodium arsenate		24
Sodium arsenite		24
Sodium azide		102
Sodium bichromate	Sodium dichromate	24, 104
Sodium bifluoride	Sodium fluoride	15
Sodium bromate		104
Sodium cacodylate	Sodium dimethylarsenate	24
Sodium carbonate		10
Sodium carbonate peroxide		104
Sodium chlorate		104
Sodium chlorite		104
Sodium chromate		24
Sodium cyanide		11
Sodium dichloroisocyanurate		104
Sodium dichromate	Sodium bichromate	24, 104
Sodium dimethylarsenate	Sodium cacodylate	24
Sodium fluoride	Sodium acid fluoride	15
Sodium hydride		105, 107
Sodium hydroxide	Caustic soda, Lye	10
Sodium hypochlorite		10, 104
Sodium hyposulfite	Sodium thiosulfate	105
Sodium methylate	Sodium methoxide	10, 107
Sodium methoxide	Sodium methylate	10, 107
Sodium molybdate		24
Sodium monoxide	Sodium oxide	10, 107
Sodium nitrate	Soda niter	104
Sodium nitride		25
Sodium nitrite		104
Sodium oxide	Sodium monoxide	10, 107
Sodium pentachlorophenate		31
Sodium perchlorate		104
Sodium permanganate		24, 104
Sodium peroxide		104, 107
Sodium phenolsulfonate		31
Sodium picramate		27, 102
Sodium polysulfide		101
Sodium potassium alloy	Nak, Nack	21, 107
Sodium selenate		24

<u>Names</u>	<u>Synonyms</u>	<u>RGN</u>
Sodium sulfide		24, 33, 105
Sodium thiosulfate		105
Stannic chloride	Tin tetrachloride	24, 107
Stannic sulfide		33, 105
Starch nitrate	Nitrostarch	27, 102
Stilbene	Diphenyl ethylene	16
Stoddard solvent		101
Strontium		24
Strontium arsenate		24
Strontium dioxide	Strontium peroxide	24, 104
Strontium monosulfide		24, 33, 105
Strontium nitrate		24, 104
Strontium peroxide	Strontium dioxide	104
Strontium tetrasulfide		24, 33, 105
Styphnic acid	Trinitroresorcinol	27, 31, 102
Styrene	Vinylbenzene	16, 28, 103
Succinic acid		3
Succinic acid peroxide		30
Sulfonyl chloride	Sulfuryl chloride	107
Sulfonyl flouride		107
Sulfotepp	Dithione*, Blada-Fum*	32
Sulfur chloride	Sulfur monochloride	107
Sulfur (elemental)		101
Sulfuric acid	Oil of Vitriol, Oleum	2, 107
Sulfuric anhydride	Sulfur trioxide	104, 107
Sulfur monochloride	Sulfur chloride	107
Sulfur mustard		20
Sulfur oxychloride	Thionyl chloride	107
Sulfur pentafluoride		15, 107
Sulfur trioxide	Sulfuric anhydride	104, 107
Sulfuryl chloride	Sulfonyl chloride	107
Sulfuryl fluoride	Sulfonyl fluoride	107
Supracide*	Ultracide*	32
Surecide*	Cyanophenphos	32
Synthetic rubber		101
TCDD	Tetrachlorodibenzo-p-dioxin	14, 17
TEDP	Tetrethyl dithionopyrophosphate	32
TEL	Tetraethyl lead	24
TEPA	Tris-(1-aziridiny) phosphine oxide	6, 32
TEPP	Tetraethyl pyrophosphate	32
THF	Tetrahydrofuran	14
TMA	Trimethylamine	7
TML	Tetramethyl lead	24
TNB	Trinitrobenzene	27, 102
TNT	Trinitrotoluene	27, 102
Tall oil		101
Tallow		101
Tar		101
Tellurium hexafluoride		15, 24
Temik*	Aldicarb	9, 20

<u>Names</u>	<u>Synonyms</u>	<u>RGN</u>
Tetraborane		105
Tetrachlorodibenzo-p-dioxin	TCDD	14, 17
Tetrachloroethane		17
Tetrachloroethylene	Perchloroethylene	17
Tetrachloromethane	Carbon tetrachloride	17
Tetrachlorophenol		17, 31
Tetrachloropropyl ether		14, 17
Tetradecene		28
Tetraethyl dithionopyrophosphate	TEDP	32
Tetraethyl lead	TEL	24
Tetraethyl pyrophosphate	TEPP	32
Tetrahydrofuran	THF	14
Tetramethylenediamine		7
Tetramethyl lead	TML	24
Tetramethyl succinonitrile		26
Tetranitromethane		27, 102
Tetraphenyl ethylene		16
Tetraphosphorus trisulfide	Phosphorus sesquisulfide	33, 105, 107
Tetraselenium tetranitride		24, 25, 102
Tetrasul	Animert* V-101	20
Tetrasulfur tetranitride		25, 102
Tetrazene		8, 102
Thallium		24
Thallium nitride		24, 25, 102
Thallium sulfide		24, 33, 105
Thallos sulfate		24
Thimet*	Phorate	32
Thionyl chloride	Sulfur oxychloride	107
Thiocarbonyl chloride	Thiophosgene	107
Thiodan*	Endosulfan	17, 20
Thionazin	Zinophos*	32
Thionyl chloride	Sulfur oxychloride	107
Thiophosgene	Thiocarbonyl chloride	107
Thiophosphoryl chloride		107
Thiram		12
Thorium		22, 23, 24
Tin tetrachloride	Stannic chloride	24, 107
Titanic chloride	Titanium tetrachloride	24, 107
Titanium		22, 23, 24
Titanium sesquisulfide		24, 33, 105
Titanium sulfate		24
Titanium sulfide		24, 33, 105
Titanium tetrachloride	Titanic chloride	24, 107
TMA	Trimethylamine	7
TNB	Trinitrobenzene	27, 102
TNT	Trinitrotoluene	27, 102
Tolualdehyde		5
Toluene	Toluol, Methylbenzene	16
Toluene diisocyanate		18, 107
Toluic acid		3

<u>Names</u>	<u>Synonyms</u>	<u>RGN</u>
Toluidine	Aminotoluene	7
Toluol	Toluene, Methylbenzene	16
Topcide*	Benzadox	6
Tranid*		9, 26
Triamphos	Wepsyn* 155	6, 32
Tribromomethane	Bromoform	17
Tri-n-butylaluminum		107
Tricadmium dinitride		24, 25
Tricalcium dinitride		25
Tricesium nitride		24, 25
Trichloroacetaldehyde	Chloral hydrate	5, 17
Trichloroborane		107
Trichloroethane		17
Trichloroethene	Trichloroethylene	17
Trichloroisocyanuric acid		104
Trichloromethane	Chloroform	17
Trichloromethyl sulfenyl chloride	Perchloromethyl mercaptan	17, 20
Trichloronitromethane	Chloropicrin	17, 27, 102
Trichlorophenoxyacetic acid		3, 17
Trichloropropane		17
Trichlorosilane	Silicochloroform	107
Tridecene		28
Triethanolamine		4, 7
Triethyl aluminum		105, 107
Triethyl antimony	Triethylstibine	24, 105, 107
Triethyl arsine		24, 107
Triethyl bismuthine		24
Triethylamine		7
Triethylene phosphoramidate	Tris(1-aziridinyl) phosphine oxide	6, 32
Triethylene tetraamine		7
Triethyl stibine	Triethyl antimony	24, 105, 107
Trifluoroethane		17
Trifluoromethylbenzene	Benzotrifluoride	17
Triisobutyl aluminum		105, 107
Trilead dinitride		24, 25, 102
Trimercury dinitride		24, 25, 102
Trimethyl aluminum		105, 107
Trimethylamine	TMA	7
Trimethyl antimony	Trimethylstibine	24, 105
Trimethyl arsine		24, 107
1,2,4-Trimethylbenzene	Pseudocumene	16
1,3,5-Trimethylbenzene	Mesitylene	16
Trimethyl bismuthine		24
Trimethyl pentane	Isooctane	29
Trimethylstibine	Trimethyl antimony	24, 105, 107
Tri-n-butylborane		105, 107
Trinitroaniline	Picramide	7, 27, 102
Trinitroanisole	Trinitrophenylmethyl ether	14, 27
Trinitrobenzene	TNB	27, 102

<u>Names</u>	<u>Synonyms</u>	<u>RGN</u>
Trinitrobenzoic acid		3, 27, 102
Trinitroglycerin	Nitroglycerin	27, 102
Trinitronaphthalene	Naphtite	27, 102
Trinitrophenol	Picric acid	27, 31, 102
Trinitrophenyl methyl ether	Trinitroanisole	14, 27
Trinitroresorcinol	Styphnic acid	27, 31, 102
Trinitrotoluene	TNT	27, 102
Trioctyl aluminum		105, 107
Triphenyl ethylene		16
Triphenyl methane		16
Tripropylamine		7
Tripropyl stibine		24, 107
Trisilyl arsine		24, 107
Tris-(1-aziridiny) phosphine oxide	TEPA, Triethylene phosphoramidate	6, 32
Trithion		32
Trithorium tetranitride		24, 25
Trivinyl stibine		24, 107
Tsumacide*		9
Tungstic acid		24
Turpentine		101
UDMH	Dimethyl hydrazine	8
Ultracide*	Supracide*	32
Undecene		28
Unisolve		101
Uranium nitrate	Uranyl nitrate	24, 104
Uranium sulfide		24, 33, 105
Uranyl nitrate	Uranium nitrate	24, 104
Urea formaldehyde		5
Urea nitrate		27, 102, 104
VC	Vinylidene chloride	17, 103
Valeraldehyde	Pentanal	5
Valeramide		6
Valeric acid		3
Vanadic acid anhydride	Vanadium pentoxide	24
Vanadium oxytrichloride		24
Vanadium pentoxide	Vanadic acid anhydride	24
Vanadium sulfate	Vanadyl sulfate	24
Vanadium tetroxide		24
Vanadium trichloride		24, 107
Vanadium trioxide		24
Vanadyl sulfate	Vanadium sulfate	24
Vapona*	DDVP	32
Vinyl acetate		13, 103
Vinyl azide		102
Vinylbenzene	Styrene	16, 28, 103
Vinyl chloride		17, 103
Vinyl cyanide		26, 103
Vinyl ethyl ether		14
Vinyl isopropyl ether		17

<u>Names</u>	<u>Synonyms</u>	<u>RGN</u>
Vinylidene chloride	VC	17, 103
Vinyl toluene		28, 103
Vinyl trichlorosilane		107
VX		20, 32
Water		106
Waxes		101
Wepsyn* 155	Triamiphos	6, 32
Wood		101
Zectran*	Dowco 139*	9
Zinc		22, 23, 24
Zinc acetylide		24, 105, 107
Zinc ammonium nitrate		24, 104
Zinc arsenate		24
Zinc arsenite		24
Zinc chloride		24
Zinc dioxide	Zinc peroxide	24, 102, 104, 107
Zinc ethyl	Diethyl zinc	24, 105, 107
Zinc cyanide		11, 24
Zinc fluoborate		24, 15
Zinc nitrate		24, 104
Zinc permanganate		24, 104
Zinc peroxide	Zinc dioxide	24, 102, 104, 107
Zinc phosphide		24, 107
Zinc salts of dimethyl dithiocarbamic acid		12, 24
Zinc sulfate		24
Zinc sulfide		24, 33, 105
Zineb*		12, 24
Zinophos*	Thioazin	20
Ziram*		12, 24
Zirconium		22, 23, 24
Zirconium chloride	Zirconium tetrachloride	24
Zirconium picramate		24, 104
Zirconium tetrachloride	Zirconium chloride	24

APPENDIX 2. LIST OF WASTE CONSTITUENTS BY CHEMICAL CLASS AND REACTIVITY

This appendix categorizes the chemical substances in Appendix 1 into reactivity groups according to molecular functional groups, chemical classes, or chemical reactivities. The substances are divided into 41 Reactivity Group Numbers (RGN) and listed consecutively in the first two pages of this appendix. RGN 1 to 34 are categorized based on molecular functional groups, 101 to 107 on chemical reactivities. The reactivity groupings here are identical to those depicted in the Hazardous Wastes Compatibility Chart (Figure 6) in Section 5 of this report.

The succeeding pages of this appendix contain the tabulations of the chemical substances in Appendix 1 under their respective RGN. All trade names in the tables are denoted by asterisks (*) consistent with the notations used in Appendix 1.

This appendix is used to obtain the RGN of hazardous wastes when the waste constituents are known only by chemical classes, molecular functional groups, or chemical reactivities. The information is used to determine the compatibility of the combinations of the wastes according to the compatibility method in Section 4 of this report.

The listing was developed from the same primary references used in Appendix 1, namely Ref. 1, 7, 8, 10, 12, 13, 14, 32, 44, 52, and 77. The reactivity groupings of waste constituents presented here are not inclusive. Additions or deletions may be made in the future when more information is available from the management of hazardous wastes.

<u>Reactivity Group Number</u>	<u>Group Name</u>
1	Acids, Mineral, Non-oxidizing
2	Acids, Mineral, Oxidizing
3	Acids, Organic
4	Alcohols and Glycols
5	Aldehydes
6	Amides
7	Amines, Aliphatic and Aromatic
8	Azo Compounds, Diazo Compounds, and Hydrazines
9	Carbamates
10	Caustics
11	Cyanides
12	Dithiocarbamates
13	Esters
14	Ethers
15	Fluorides, Inorganic
16	Hydrocarbons, Aromatic

<u>Reactivity Group Number</u>	<u>Group Name</u>
17	Halogenated Organics
18	Isocyanates
19	Ketones
20	Mercaptans and Other Organic Sulfides
21	Metals, Alkali and Alkaline Earth, Elemental and Alloys
22	Metals Other Elemental and Alloys in the Form of Powders, Vapors or Sponges
23	Metals, Other Elemental, and Alloy, as Sheets, Rods, Moldings, Drops, etc
24	Metals and Metal Compounds, Toxic
25	Nitrides
26	Nitriles
27	Nitro Compounds
28	Hydrocarbon, Aliphatic, Unsaturated
29	Hydrocarbon, Aliphatic, Saturated
30	Peroxides and Hydroperoxides, Organic
31	Phenols and Creosols
32	Organophosphates, Phosphothioates and Phosphodithioates
33	Sulfides, Inorganic
34	Epoxides
101	Combustible and Flammable Materials, Miscellaneous
102	Explosives
103	Polymerizable Compounds
104	Oxidizing Agents, Strong
105	Reducing Agents, Strong
106	Water and Mixtures Containing Water
107	Water Reactive Substances

GROUP 1 Acids, Mineral, Non-Oxidizing

Boric acid
Chlorosulfonic acid
Difluorophosphoric acid
Disulfuric acid
Fluoroboric acid
Fluorosulfonic acid
Fluosilicic acid
Hexafluorophosphoric acid
Hydriodic acid
Hexafluorophosphoric acid
Hydriodic acid
Hydrobromic acid
Hydrochloric acid
Hydrocyanic acid
Hydrofluoric acid
Monofluorophosphoric acid

Permonosulfuric acid
Phosphoric acid
Selenous acid

GROUP 2 Acids, Mineral Oxidizing

Bromic acid
Chloric acid
Chromic acid
Hypochlorous acid
Nitric acid
Nitrohydrochloric acid
Oleum
Perbromic acid
Perchloric acid
Perchlorous acid

GROUP 2 Acids, Mineral Oxidizing
cont'd

Periodic acid
Sulfuric acid

GROUP 3 Acids, Organic (All Isomers)

Acetic acid
Acrylic acid
Adipic acid
Benzoic acid
Butyric acid
Capric acid
Caproic acid
Caprylic acid
Chloromethylphenoxyacetic acid
Cyanoacetic acid
Dichlorophenoxyacetic acid
Endothal
Fluoroacetic acid
Formic acid
Fumaric acid
Glycolic acid
Hydroxydibromobenzoic acid
Maleic acid
Monochloroacetic acid
Oxalic acid
Peracetic acid
Phenyl acetic acid
Phthalic acid
Propionic acid
Succinic acid
Trichlorophenoxyacetic acid
Trinitrobenzoic acid
Toluic acid
Valeric acid

GROUP 4 Alcohols and Glycols (All Iso-
mers)

Acetone cyanohydrin
Allyl alcohol
Aminoethanol
Amyl alcohol
Benzyl alcohol
Butanediol
Butyl alcohol
Butyl cellosolve*
Chloroethanol
Crotyl alcohol
Cyclohexanol

Cyclopentanol
Decanol
Diacetone alcohol
Dichloropropanol
Diethanol amine
Diisopropanolamine
Ethanol
Ethoxyethanol
Ethylene chlorohydrin
Ethylene cyanohydrin
Ethylene glycol
Ethylene glycol monomethyl ether
Glycerin
Heptanol
Hexanol
Isobutanol
Isopropanol
Mercaptoethanol
Methanol
Monoethanol amine
Monoisopropanol amine
Monoisopropanol amine
Nonanol
Octanol
Propanol
Propylene glycol
Propylene glycol monomethyl ether
Triethanolamine

GROUP 5 Aldehydes (All Isomers)

Acetaldehyde
Acrolein
Benzaldehyde
Butyraldehyde
Chloral hydrate
Chloroacetaldehyde
Crotonaldehyde
Formaldehyde
Furfural
Glutaraldehyde
Heptanal
Hexanal
Nonanal
Octanal
Propionaldehyde
Tolualdehyde
Urea formaldehyde
Valeraldehyde

GROUP 6 Amides (All Isomers)

Acetamide
Benzadox
Bromobenzoyl acetanilide
Butyramide
Carbetamide
Diethyltoluamide
Dimethylformamide
Dimefox
Diphenamide
Fluoroacetanilide
Formamide
Propionamide
Schradan
Tris-(1-aziridiny) phosphine oxide
Wepsyn* 155
Valeramide

GROUP 7 Amines, Aliphatic and Aromatic (All Isomers)

Aminodiphenyl
Aminoethanol
Aminoethanolamine
Aminophenol
Aminopropionitrile
Amylamine
Aminothiazole
Aniline
Benzidine
Benzylamine
Butylamine
Chlorotoluidine
Crimidine
Cupriethylenediamine
Cyclohexylamine
Dichlorobenzidine
Diethanolamine
Diethylamine
Diethylenetriamine
Diisopropanolamine
Dimethylamine
Dimethylaminoazobenzene
Diphenylamine
Diphenylamine chloroarsine
Dipicrylamine
Dipropylamine
Ethylamine
Ethylenediamine
Ehtyleneimine
Hexamethylenediamine

Hexamethylenetetraamine
Hexylamine
Isopropylamine
Methylamine
N-Methyl aniline
4,4-Methylene bis(2-chloroaniline)
Methyl ethyl pyridine
Monoethanolamine
Monoisopropanolamine
Morpholine
Naphthylamine
Nitroaniline
Nitroaniline
Nitroaniline
Nitrogen mustard
Nitrosodimethylamine
Pentylamine
Phenylene diamine
Picramide
Picridine
Piperidine
Propylamine
Propyleneimine
Pyridine
Tetramethylenediamine
Toluidine
Triethanolamine
Triethylamine
Triethylenetetraamine
Trimethylamine
Tripropylamine

GROUP 8 Azo Compounds, Diazo Compounds and Hydrazines (All Isomers)

Aluminum tetraazidoborate
Aminothiazole
Azidocarbonyl guanidine
Azido-s-triazole
a,a'-Azodiisobutyronitrile
Benzene diazonium chloride
Benzotriazole
t-Butyl azidoformate
Chloroazodin
Chlorobenzotriazole
Diazodinitrophenol
Diazidoethane
Dimethylamino azobenzene
Dimethyl hydrazine

GROUP 8 Azo Compounds, Diazo Compounds and Hydrazines (All Isomers) cont'd

Dinitrophenyl hydrazine
Guanyl nitrosoaminoguanilydine hydrazine
Hydrazine
Hydrazine azide
Methyl hydrazine
Mercaptobenzothiazole
Phenyl hydrazine hydrochloride
Tetrazene

GROUP 9 Carbamates

Aldicarb
Bassa*
Baygon*
Butacarb
Bux*
Carbaryl
Carbanolate
Dioxacarb
Dowco* 139
Formetanate hydrochloride
Furadan*
Hopcide*
N-Isopropylmethylcarbamate
Landrin*
Matacil*
Meobal
Mesurol*
Methomyl
Mipcin*
Mobam*
Oxamyl
Pirimicarb
Promecarb
Tranid*
Tsumacide*

GROUP 10 Caustics

Ammonia
Ammonium hydroxide
Barium hydroxide
Barium oxide
Beryllium hydroxide
Cadmium amide
Calcium hydroxide
Calcium oxide
Lithium amide

Lithium hydroxide
Potassium aluminate
Potassium butoxide
Potassium hydroxide
Sodium aluminate
Sodium amide
Sodium carbonate
Sodium hydroxide
Sodium hypochlorite
Sodium methylate
Sodium oxide

GROUP 11 Cyanides

Cadmium cyanide
Copper cyanide
Cyanogen bromide
Hydrocyanic acid
Lead cyanide
Mercuric cyanide
Mercuric oxycyanide
Nickel cyanide
Potassium cyanide
Silver cyanide
Sodium cyanide
Zinc cyanide

GROUP 12 Dithiocarbamates

CDEC
Dithane* M-45
Ferbam
Maneb
Metham
Nabam
Niacide*
Polyram-combi*
Selenium diethyl dithiocarbamate
Thiram
Zinc salts of dimethyl dithiocarbamic acid
Zineb
Ziram

GROUP 13 Esters (All Isomers)

Allyl chlorocarbonate
Amyl acetate
Butyl acetate

GROUP 13 Esters (All Isomers) cont'd

Butyl acrylate
Butyl benzyl phthalate
Butyl formate
Dibutyl phthalate
Diethylene glycol monobutyl ether acetate
Ethyl acetate
Ethyl acrylate
Ethyl butyrate
Ethyl chloroformate
Ethyl formate
2-Ethyl hexylacrylate
Ethyl propionate
Glycol diacetate
Isobutyl acetate
Isobutyl acrylate
Isodecyl acrylate
Isopropyl acetate
Medinoterb acetate
Methyl acetate
Methyl acrylate
Methyl amyl acetate
Methyl butyrate
Methyl chloroformate
Methyl formate
Methyl methacrylate
Methyl propionate
Methyl valerate
Propiolactone
Propyl acetate
Propyl formate
Vinyl acetate

GROUP 14 Ethers (All Isomers)

Anisole
Butyl cellosolve*
Bromodimethoxyaniline
Dibutyl ether
Dichloroethyl ether
Dimethyl ether
Dimethyl formal
Dioxane
Diphenyl oxide
Ethoxyethanol
Ethyl ether
Ethylene glycol monomethyl ether
Furan
Glycol ether
Isopropyl ether
Methyl butyl ether

Methyl chloromethyl ether
Methyl ethyl ether
Polyglycol ether
Propyl ether
Propylene glycol monomethyl ether
TCDD
Tetrachloropropyl ether
Tetrahydrofuran
Trinitroanisoie
Vinyl ethyl ether
Vinyl isopropyl ether

GROUP 15 Fluorides, Inorganic

Aluminum fluoride
Ammonium bifluoride
Ammonium fluoride
Barium fluoride
Beryllium fluoride
Cadmium fluoride
Calcium fluoride
Cesium fluoride
Chromic fluoride
Fluoroboric acid
Fluorosilicic acid
Hexafluorophosphoric acid
Hydrofluoric acid
Magnesium fluoride
Potassium fluoride
Selenium fluoride
Silicon tetrafluoride
Sodium fluoride
Sulfur pentafluoride
Tellurium hexafluoride
Zinc fluoroborate

GROUP 16 Hydrocarbons, Aromatic (All Isomers)

Acenaphthene
Anthracene
Benz-a-pyrene
Benzene
n-Butyl benzene
Chrysene
Cumene
Cymene
Decyl benzene
Diethyl benzene
Diphenyl

GROUP 16 Hydrocarbons, Aromatic (All Isomers) cont'd

Diphenyl acetylene
Diphenyl ethane
Diphenyl ethylene
Diphenyl methane
Dodecyl benzene
Dowtherm
Durene
Ethyl benzene
Fluoranthrene
Fluorene
Hemimellitene
Hexamethyl benzene
Indene
Isodurene
Mesitylene
Methyl naphthalene
Naphthalene
Pentamethyl benzene
Phenanthrene
Phenyl acetylene
Propyl benzene
Pseudocumene
Styrene
Tetraphenyl ethylene
Toluene
Stilbene
Triphenylethylene
Triphenylmethane

GROUP 17 Halogenated Organics (All Isomers)

Acetyl bromide
Acetyl chloride
Aldrin
Allyl bromide
Allyl chloride
Allyl chlorocarbonate
Amyl chloride
Benzal bromide
Benzal chloride
Benzotribromide
Benzotrichloride
Benzyl bromide
Benzyl chloride
Benzyl chlorocarbonate
Bromoacetylene
Bromobenzyl trifluoride
Bromoform

Bromophenol
Bromopropyne
Bromotrichloromethane
Bromotrifluoromethane
Bromoxynil
Butyl fluoride
Carbon tetrachloride
Carbon tetrafluoride
Carbon tetraiodide
Chloral hydrate
Chlordane
Chloroacetaldehyde
Chloroacetic acid
Chloroacetophenone
Chloroacrylonitrile
Chloroazodin
Chlorobenzene
Chlorobenzotriazole
Chlorobenzoyl peroxide
Chlorobenzylidene malononitrile
Chlorobutyronitrile
Chlorocresol
Chlorodinitrotoluene
Chloroethanol
Chloroethylenimine
Chloroform
Chlorohydrin
Chloromethyl methyl ether
Chloromethyl phenoxyacetic acid
Chloronitroaniline
Chlorophenol
Chlorophenyl isocyanate
Chloropicrin
Chlorothion
Chlorotoluidine
CMME
Crotyl bromide
Crotyl chloride
DDD
DDT
DDVP
Dibromochloropropane
Dichloroacetone
Dichlorobenzene
Dichlorobenzidine
Dichloroethane
Dichloroethylene
Dichloroethyl ether
Dichloromethane

GROUP 17 Halogenated Organics (All Isomers) cont'd

Dichlorophenol
Dichlorophenoxy acetic acid
Dichloropropane
Dichloropropanol
Dichloropropylene
Dieldrin
Diethyl chloro vinyl phosphate
Dichlorophene
Dinitrochlorobenzene
Endosulfan
Endrin
Epichlorohydrin
Ethyl chloroformate
Ethylene chlorohydrin
Ethylene dibromide
Ethylene dichloride
Fluoroacetanilide
Freons*
Heptachlor
Hexachlorobenzene
Hydroxydibromobenzoic acid
Isopropyl chloride
 α -Isopropyl methyl phosphoryl fluoride
Lindane
Methyl bromide
Methyl chloride
Methyl chloroform
Methyl chloroformate
Methyl ethyl chloride
Methyl iodide
Monochloroacetone
Nitrochlorobenzene
Nitrogen mustard
Pentachlorophenol
Perchloroethylene
Pechloromethylmercaptan
Picryl chloride
Polybrominated biphenyls
Polychlorinated biphenyls
Polychlorinated triphenyls
Propargyl bromide
Propargyl chloride
TCDD
Tetrachloroethane
Tetrachlorophenol
Tetrachloropropyl ether
Trichloroethane
Trichloroethylene
Trichlorophenoxyacetic acid

Trichloropropane
Trifluoroethane
Vinyl chloride
Vinylidene chloride

GROUP 18 Isocyanates (All Isomers)

Chlorophenyl isocyanate
Diphenylmethane diisocyanate
Methyl isocyanate
Methylene diisocyanate
Polyphenyl polymethylisocyanate
Toluene diisocyanate

GROUP 19 Ketones (All Isomers)

Acetone
Acetophenone
Acetyl acetone
Benzophenone
Bromobenzoyl acetanilide
Chloroacetophenone
Coumafuryl
Coumatetralyl
Cyclohexanone
Diacetone alcohol
Diacetyl
Dichloroacetone
Diethyl ketone
Diisobutyl ketone
Heptanone
Hydroxyacetophenone
Isophorone
Mesityl oxide
Methyl t-butyl ketone
Methyl ethyl ketone
Methyl isobutyl ketone
Methyl isopropenyl ketone
Methyl n-propyl ketone
Methyl vinyl ketone
Monochloroacetone
Nonanone
Octanone
Pentanone
Quinone

GROUP 20 Mercaptans and Other Organic Sulfides (All Isomers)

Aldicarb
Amyl mercaptan
Butyl mercaptan
Carbon disulfide
Dimethyl sulfide
Endosulfan
Ethyl mercaptan
Mercaptobenzothiazole
Mercaptoethanol
Methomyl
Methyl mercaptan
Naphthyl mercaptan
Perchloromethyl mercaptan
Phospholan
Polysulfide polymer
Propyl mercaptan
Sulfur mustard
Tetrasul
Thionazin
VX

GROUP 21 Metals, Alkali and Alkaline Earth, Elemental

Barium
Calcium
Cesium
Lithium
Magnesium
Potassium
Rubidium
Sodium
Sodium-potassium alloy
Strontium

GROUP 22 Metals, Other Elemental and Alloys in the Form of Powders, Vapors or Sponges

Aluminum
Bismuth
Cerium
Cobalt
Hafnium
Indium
Magnesium
Manganese
Mercury (vapor)
Molybdenum

Nickel
Raney nickel
Selenium
Titanium
Thorium
Zinc
Zirconium

GROUP 23 Metals, Other Elemental and Alloys as Sheets, Rods, Moldings, Drops, etc.

Aluminum
Antimony
Bismuth
Brass
Bronze
Cadmium
Calcium-manganese-silicon alloy
Chromium
Cobalt
Copper
Indium
Iron
Lead
Manganese
Molybdenum
Osmium
Selenium
Titanium
Thorium
Zinc
Zirconium

GROUP 24 Metals and Metal Compounds, Toxic

Ammonium arsenate
Ammonium dichromate
Ammonium hexanitrocobaltate
Ammonium molybdate
Ammonium nitridoosmate
Ammonium permanganate
Ammonium tetrachromate
Ammonium tetraperoxychromate
Ammonium trichromate
Antimony
Antimony nitride
Antimony oxychloride

GROUP 24 Metals and Metal Com-
pounds, Toxic

Antimony pentachloride	Beryllium hydride
Antimony pentafluoride	Beryllium hydroxide
Antimony pentasulfide	Beryllium oxide
Antimony perchlorate	Beryllium tetrahydroborate
Antimony potassium tartrate	Bismuth
Antimony sulfate	Bismuth chromate
Antimony tribromide	Bismuthic acid
Antimony trichloride	Bismuth nitride
Antimony triiodide	Bismuth pentafluoride
Antimony trifluoride	Bismuth pentoxide
Antimony trioxide	Bismuth sulfide
Antimony trisulfide	Bismuth tribromide
Antimony trivinyI	Bismuth trichloride
Arsenic	Bismuth triiodide
Arsenic pentaselenide	Bismuth trioxide
Arsenic pentoxide	Borane
Arsenic pentasulfide	Bordeaux arsenites
Arsenic sulfide	Boron arsenotribromide
Arsenic tribromide	Boron bromodiodide
Arsenic trichloride	Boron dibromiodide
Arsenic trifluoride	Boron nitride
Arsenic triiodide	Boron phosphide
Arsenic trisulfide	Boron triazide
Arsines	Boron tribromide
Barium	Boron triiodide
Barium azide	Boron trisulfide
Barium carbide	Boron trichloride
Barium chlorate	Boron trifluoride
Barium chloride	Cacodylic acid
Barium chromate	Cadmium
Barium fluoride	Cadmium acetylide
Barium fluosilicate	Cadmium amide
Barium hydride	Cadmium azide
Barium hydroxide	Cadmium bromide
Barium hypophosphide	Cadmium chlorate
Barium iodate	Cadmium chloride
Barium iodide	Cadmium cyanide
Barium nitrate	Cadmium fluoride
Barium oxide	Cadmium hexamine chlorate
Barium perchlorate	Cadmium hexamine perchlorate
Barium permanganate	Cadmium iodide
Barium peroxide	Cadmium nitrate
Barium phosphate	Cadmium nitride
Barium stearate	Cadmium oxide
Barium sulfide	Cadmium phosphate
Barium sulfite	Cadmium sulfide
Beryllium	Cadmium trihydrazine chlorate
Beryllium-copper alloy	Cadmium trihydrazine perchlorate
Beryllium fluoride	Calcium arsenate

GROUP 24 Metals and Metal Com-
pounds, Toxic cont'd

Calcium arsenite	Lead oxide
Chromic chloride	Lead styphnate
Chromic fluoride	Lead sulfide
Chromic oxide	Lewisite
Chromic sulfate	London purple
Chromium	Magnesium arsenate
Chromium sulfide	Magnesium arsenite
Chromium trioxide	Manganese
Chromyl chloride	Manganese acetate
Cobalt	Manganese arsenate
Cobaltous bromide	Manganese bromide
Cobaltous chloride	Manganese chloride
Cobaltous nitrate	Manganese methylcyclopentadienyl tricar-
Cobaltous sulfate	bonyl
Cobaltous resinate	Manganese nitrate
Copper	Manganese sulfide
Copper acetoarsenite	Mercuric acetate
Copper acetylde	Mercuric ammonium chloride
Copper arsenate	Mercuric benzoate
Copper arsenite	Mercuric bromide
Copper chloride	Mercuric chloride
Copper chlorotetrazole	Mercuric cyanide
Copper cyanide	Mercuric iodide
Copper nitrate	Mercuric nitrate
Copper nitride	Mercuric oleate
Copper sulfate	Mercuric oxide
Copper sulfide	Mercuric oxycyanide
Cupriethylene diamine	Mercuric potassium iodide
Cyanochloropentane	Mercuric salicylate
Diethyl zinc	Mercuric subsulfate
Diisopropyl beryllium	Mercuric sulfate
Diphenylamine chloroarsine	Mercuric sulfide
Ethyl dichloroarsine	Mercuric thiocyanide
Ethylene chromic oxide	Mercuriol
Ferric arsenate	Mercurous bromide
Ferrous arsenate	Mercurous gluconate
Hydrogen selenide	Mercurous iodide
Indium	Mercurous nitrate
Lead	Mercurous oxide
Lead acetate	Mercurous sulfate
Lead arsenate	Mercury
Lead arsenite	Mercury fulminate
Lead azide	Methoxyethylmercuric chloride
Lead carbonate	Methyl dichloroarsine
Lead chlorite	Molybdenum
Lead cyanide	Molybdenum sulfide
Lead dinitroresorcinate	Molybdenum trioxide
Lead mononitroresorcinate	Molybdic acid
Lead nitrate	Nickel

GROUP 24 Metals and Metal Com-
pounds, Toxic cont'd

Nickel acetate
 Nickel antimonide
 Nickel arsenate
 Nickel arsenite
 Nickel carbonyl
 Nickel chloride
 Nickel cyanide
 Nickel nitrate
 Nickel selenide
 Nickel subsulfide
 Nickel sulfate
 Osmium
 Osmium amine nitrate
 Osmium amine perchlorate
 Phenyl dichloroarsine
 Potassium arsenate
 Potassium arsenite
 Potassium dichromate
 Potassium permanganate
 Selenium
 Selenium fluoride
 Selenium diethyl dithiocarbamate
 Selenous acid
 Silver acetylde
 Silver azide
 Silver cyanide
 Silver nitrate
 Silver nitride
 Silver styphnate
 Silver sulfide
 Silver tetrazene
 Sodium arsenate
 Sodium arsenite
 Sodium cacodylate
 Sodium chromate
 Sodium dichromate
 Sodium molybdate
 Sodium permanganate
 Sodium selenate
 Stannic chloride
 Stannic sulfide
 Strontium arsenate
 Strontium monosulfide
 Strontium nitrate
 Strontium peroxide
 Strontium tetrasulfide
 Tellurium hexafluoride
 Tetraethyl lead
 Tetramethyl lead

Tetraselenium tetranitride
 Thallium
 Thallium nitride
 Thallium sulfide
 Thallous sulfate
 Thorium
 Titanium
 Titanium sulfate
 Titanium sesquisulfide
 Titanium tetrachloride
 Titanium sulfide
 Tricadmium dinitride
 Tricesium nitride
 Triethyl arsine
 Triethyl bismuthine
 Triethyl stibine
 Trilead dinitride
 Trimercury dinitride
 Trimethyl arsine
 Trimethyl bismuthine
 Trimethyl stibine
 Tripropyl stibine
 Trisilyl arsine
 Trithorium tetranitride
 Trivinyl stibine
 Tungstic acid
 Uranium sulfide
 Uranyl nitrate
 Vanadic acid anhydride
 Vanadium oxytrichloride
 Vanadium tetroxide
 Vanadium trioxide
 Vanadium trichloride
 Vanadyl sulfate
 Zinc
 Zinc acetylde
 Zinc ammonium nitrate
 Zinc arsenate
 Zinc arsenite
 Zinc chloride
 Zinc cyanide
 Zinc fluoborate
 Zinc nitrate
 Zinc permanganate
 Zinc peroxide
 Zinc phosphide
 Zinc salts of dimethyldithio carbamic acid
 Zinc sulfate
 Zinc sulfide

GROUP 24 Metals and Metal Com-
pounds, Toxic cont'd

Zirconium
Zirconium chloride
Zirconium picramate

GROUP 25 Nitrides

Antimony nitride
Bismuth nitride
Boron nitride
Copper nitride
Disulfur dinitride
Lithium nitride
Potassium nitride
Silver nitride
Sodium nitride
Tetraselenium tetranitride
Tetrasulfur tetranitride
Thallium nitride
Tricadmium dinitride
Ticalcium dinitride
Tricesium nitride
Trilead dinitride
Trimercury dinitride
Trithorium tetranitride

GROUP 26 Nitriles (All Isomers)

Acetone cyanohydrin
Acetonitrile
Acrylonitrile
Adiponitrile
Aminopropionitrile
Amyl cyanide
a,a'-Azodiisobutyronitrile
Benzonitrile
Bromoxynil
Butyronitrile
Chloroacrylonitrile
Chlorobenzylidene malononitrile
Chlorobutyronitrile
Cyanoacetic acid
Cyanochloropentane
Cyanogen
Ethylene cyanohydrin
Glycolonitrile
Phenyl acetonitrile
Phenyl valerylnitrile
Propionitrile
Surecide*

Tetramethyl succinonitrile
Tranid*
Vinyl cyanide

GROUP 27 Nitro Compounds (All Iso-
mers)

Acetyl nitrate
Chlorodinitrofluorene
Chloronitroaniline
Chloropicrin
Collodion
Diazodinitrophenol
Diethylene glycol dinitrate
Dinitrobenzene
Dinitrochlorobenzene
Dinitrocresol
Dinitrophenol
Dinitrophenyl hydrazine
Dinitrotoluene
Dinoseb
Dipentaerythritol hexanitrate
Dipicryl amine
Ethyl nitrate
Ethyl nitrite
Glycol dinitrate
Glycol monolactate trinitrate
Guanidine nitrate
Lead dinitroresorcinate
Lead mononitroresorcinate
Lead styphnate
Mannitol hexanitrate
Medinoterb acetate
Nitroaniline
Nitrobenzene
Nitrobiphenyl
Nitrocellulose
Nitrochlorobenzene
Nitroglycerin
Nitrophenol
Nitropropane
N-Nitrosodimethylamine
Nitrosoguanidine
Nitrostarch
Nitroxylene
Pentaerythritol tetranitrate
Picramide
Picric acid
Picryl chloride

GROUP 27 Nitro Compounds (All Isomers) cont'd

Polyvinyl nitrate
Potassium dinitrobenzfuroxan
RDX
Silver styphnate
Sodium picramate
Tetranitromethane
Trinitroanisole
Trinitrobenzene
Trinitrobenzoic acid
Trinitronaphthalene
Trinitroresorcinol
Trinitrotoluene
Urea nitrate

GROUP 28 Hydrocarbons, Aliphatic, Unsaturated (All Isomers)

Acetylene
Allene
Amylene
Butadiene
Butadiyne
Butene
Cyclopentene
Decene
Dicyclopentadiene
Diisobutylene
Dimethyl acetylene
Dimethyl butyne
Dipentene
Dodecene
Ethyl acetylene
Ethylene
Heptene
Hexene
Hexyne
Isobutylene
Isooctene
Isoprene
Isopropyl acetylene
Methyl acetylene
Methyl butene
Methyl butyne
Methyl styrene
Nonene
Octadecyne
Octene
Pentene
Pentyne

Polybutene
Polypropylene
Propylene
Styrene
Tetradecene
Tridecene
Undecene
Vinyl toluene

GROUP 29 Hydrocarbons, Aliphatic, Saturated

Butane
Cycloheptane
Cyclohexane
Cyclopentane
Cyclopropane
Decalin
Decane
Ethane
Heptane
Hexane
Isobutane
Isohexane
Isooctane
Isopentane
Methane
Methyl cyclohexane
Neohexane
Nonane
Octane
Pentane
Propane

GROUP 30 Peroxides and Hydroperoxides Organic (All Isomers)

Acetyl benzoyl peroxide
Acetyl peroxide
Benzoyl peroxide
Butyl hydroperoxide
Butyl peroxide
Butyl peroxyacetate
Butyl peroxybenzoate
Butyl peroxypropionate
Caprylyl peroxide
Chlorobenzoyl peroxide
Cumene hydroperoxide
Cyclohexanone peroxide

GROUP 30 Peroxides and Hydroperoxides
Organic (All Isomers) cont'd

Dicumyl peroxide
Diisopropylbenzene hydroperoxide
Diisopropyl peroxydicarbonate
Dimethylhexane dihydroperoxide
Isopropyl percarbonate
Lauroyl peroxide
Methyl ethyl ketone peroxide
Peracetic acid
Succinic acid peroxide

GROUP 31 Phenols, Cresols (All Iso-
mers)

Amino phenol
Bromophenol
Bromoxynil
Carbacrol
Carbolic oil
Catecol
Chlorocresol
Chlorophenol
Coal tar
Cresol
Creosote
Cyclohexyl phenol
Dichlorophenol
Dinitrocresol
Dinitrophenol
Dinoseb
Eugenol
Guaiacol
Hydroquinone
Hydroxyacetophenone
Hydroxydiphenol
Hydroxyhydroquinone
Isoeugenol
Naphthol
Nitrophenol
Nonyl phenol
Pentachlorophenol
Phenol
o-Phenyl phenol
Phloroglucinol
Picric acid
Pyrogallol
Resorcinol
Saligenin
Sodium pentachlorophenate
Sodium phenolsulfonate

Tetrachlorophenol
Thymol
Trichlorophenol
Trinitroresorcinol

GROUP 32 Organophosphates, Phospho-
thioates, and Phosphodithio-
ates

Abate*
Azinphos ethyl
Azodrin*
Bidrin*
Bomyl*
Chlorfenvinphos
Chlorothion*
Coroxon*
DDVP
Demeton
Demeton-s-methyl sulfoxid
Diazinon*
Diethyl chlorovinyl phosphate
Dimethyldithiophosphoric acid
Dimefox
Dioxathion
Disulfoton
Dyfonate*
Endothion
EPN
Ethion*
Fensulfothion
Guthion*
Hexaethyl tetraphosphate
Malathion
Mecarbam
Methyl parathion
Mevinphos
Mocap*
 α -Isopropyl methylphosphoryl fluoride
Paraoxon
Parathion
Phorate
Phosphamidon
Phospholan
Potasan
Prothoate
Shradan
Sulfotepp
Supracide*

GROUP 32 Organophosphates, Phospho-
thioates, and Phosphodithio-
ates cont'd

Shradan
Sulfotepp
Supracide*
Surecide*
Tetraethyl dithionopyrophosphate
Tetraethyl pyrophosphate
Thionazin
Tris-(1-aziridiny) phosphine oxide
VX
Wepsyn* 155

GROUP 33 Sulfides, Inorganic

Ammonium sulfide
Antimony pentasulfide
Antimony trisulfide
Arsenic pentasulfide
Arsenic sulfide
Arsenic trisulfide
Barium sulfide
Beryllium sulfide
Bismuth sulfide
Bismuth trisulfide
Boron trisulfide
Cadmium sulfide
Calcium sulfide
Cerium trisulfide
Cesium sulfide
Chromium sulfide
Copper sulfide
Ferric sulfide
Ferrous sulfide
Germanium sulfide
Gold sulfide
Hydrogen sulfide
Lead sulfide
Lithium sulfide
Magnesium sulfide
Manganese sulfide
Mercuric sulfide
Molybdenum sulfide
Nickel subsulfide
Phosphorous heptasulfide
Phosphorous pentasulfide
Phosphorous sesquisulfide
Phosphorous trisulfide
Potassium sulfide
Silver sulfide

Sodium sulfide
Stannic sulfide
Strontium monosulfide
Strontium tetrasulfide
Thallium sulfide
Titanium sesquisulfide
Titanium sulfide
Uranium sulfide
Zinc sulfide

GROUP 34 Epoxides

Butyl glycidyl ether
t-Butyl-3-phenyl oxazirane
Cresol glycidyl ether
Diglycidyl ether
Epichlorohydrin
Epoxybutane
Epoxybutene
Epoxyethylbenzene
Ethylene oxide
Glycidol
Phenyl glycidyl ether
Propylene oxide

GROUP 101 Combustible and Flammable
Materials, Miscellaneous

Alkyl resins
Asphalt
Bakelite*
Buna-N*
Bunker fuel oil
Camphor oil
Carbon, activated, spent
Cellulose
Coal oil
Diesel oil
Dynes thinner
Gas oil, cracked
Gasoline
Grease
Isotactic propylene
J-100
Jet oil
Kerosene
Lacquer thinner
Methyl acetone

GROUP 101 Combustible and Flammable
Materials, Miscellaneous
cont'd

Mineral spirits
Naphtha
Oil of bergamot
Orris root
Paper
Petroleum naphtha
Petroleum oil
Polyamide resin
Polyester resin
polyethylene
Polymeric oil
Polypropylene
Polystyrene
Polysulfide polymer
Polyurethane
Polyvinyl acetate
Polyvinyl chloride
Refuse
Resins
Sodium polysulfide
Stoddard solvent
Sulfur (elemental)
Synthetic rubber
Tall oil
Tallow
Tar
Turpentine
Unisolve
Waxes
Wood

GROUP 102 Explosives

Acetyl azide
Acetyl nitrate
Ammonium azide
Ammonium chlorate
Ammonium hexanitrocobaltate
Ammonium nitrate
Ammonium nitrite
Ammonium periodate
Ammonium permanganate
Ammonium picrate
Ammonium tetraperoxychromate
Azidocarbonyl guanidine
Barium azide
Benzene diazonium chloride
Benzotriazole

Benzoyl peroxide
Bismuth nitride
Boron triazide
Bromine azide
Butanetriol trinitrate
t-Butyl hypochlorite
Cadmium azide
Cadmium hexamine chlorate
Cadmium hexamine perchlorate
Cadmium nitrate
Cadmium nitride
Cadmium trihydrazine chlorate
Calcium nitrate
Cesium azide
Chlorine azide
Chlorine dioxide
Chlorine fluoroxide
Chlorine trioxide
Chloroacetylene
Chloropicrin
Copper acetylide
Cyanuric triazide
Diazidoethane
Diazodinitrophenol
Diethylene glycol dinitrate
Dipentaerithritol hexanitrate
Dipicryl amine
Disulfur dinitride
Ethyl nitrate
Ethyl nitrite
Fluorine azide
Glycol dinitrate
Glycol monolactate trinitrate
Gold fulminate
Guanyl nitrosaminoguanilydene hydrazine
HMX
Hydrazine azide
Hydrazoic acid
Lead azide
Lead dinitroresorcinate
Lead mononitroresorcinate
Lead styphnate
Mannitol hexanitrate
Mercuric oxycyanide
Mercury fulminate
Nitrocarbonitrate
Nitrocellulose
Nitroglycerin

GROUP 102 Explosives cont'd

Nitrosoguanidine
Nitrostarch
Pentaerythritol tetranitrate
Picramide
Picric acid
Picryl chloride
Polyvinyl nitrate
Potassium dinitrobenzfuroxan
Potassium nitrate
RDX
Silver acetylde
Silver azide
Silver nitride
Silver styphnate
Silver tetrazene
Smokeless powder
Sodium azide
Sodium picramate
Tetranitromethane
Tetraselenium tetranitride
Tetrasulfur tetranitride
Tetrazene
Thallium nitride
Trilead dinitride
Trimercury dinitride
Trinitrobenzene
Trinitrobenzoic acid
Trinitronaphthalene
Trinitroresorcinol
Trinitrotoluene
Urea nitrate
Vinyl azide
Zinc peroxide

GROUP 103 Polymerizable Compounds

Acrolein
Acrylic acid
Acrylonitrile
Butadiene
n-Butyl acrylate
Ethyl acrylate
Ethylene oxide
Ethylenimine
2-Ethylhexyl acrylate
Isobutyl acrylate
Isoprene
Methyl acrylate
Methyl methacrylate
2-Methyl styrene

Propylene oxide
Styrene
Vinyl acetate
Vinyl chloride
Vinyl cyanide
Vinylidene chloride
Vinyl toluene

GROUP 104 Oxidizing Agents, Strong

Ammonium chlorate
Ammonium dichromate
Ammonium nitridoosmate
Ammonium perchlorate
Ammonium periodate
Ammonium permanganate
Ammonium persulfate
Ammonium tetrachromate
Ammonium tetraperoxychromate
Ammonium trichromate
Antimony perchlorate
Barium bromate
Barium chlorate
Barium iodate
Barium nitrate
Barium perchlorate
Barium permanganate
Barium peroxide
Bromic acid
Bromine
Bromine monofluoride
Bromine pentafluoride
Bromine trifluoride
t-Butyl hypochlorite
Cadmium chlorate
Cadmium nitrate
Calcium bromate
Calcium chlorate
Calcium chlorite
Calcium hypochlorite
Calcium iodate
Calcium nitrate
Calcium perchromate
Calcium permanganate
Calcium peroxide
Chloric acid
Chlorine
Chlorine dioxide
Chlorine fluoroxide
Chlorine monofluoride

GROUP 104 Oxidizing Agents, Strong
cont'd

Chlorine monoxide
Chlorine pentafluoride
Chlorine trifluoride
Chlorine trioxide
Chromic acid
Chromyl chloride
Cobaltous nitrate
Copper nitrate
Dichloroamine
Dichloroisocyanuric acid
Ethylene chromic oxide
Fluorine
Fluorine monoxide
Guanidine nitrate
Hydrogen peroxide
Iodine pentoxide
Lead chlorite
Lead nitrate
Lithium hypochlorite
Lithium peroxide
Magnesium chlorate
Magnesium nitrate
Magnesium perchlorate
Magnesium peroxide
Manganese nitrate
Mercuric nitrate
Mercurous nitrate
Nickel nitrate
Nitrogen dioxide
Osmium amine nitrate
Osmium amine perchlorate
Oxygen difluoride
Perchloryl fluoride
Phosphorus oxybromide
Phosphorus oxychloride
Potassium bromate
Potassium dichloroisocyanurate
Potassium dichromate
Potassium nitrate
Potassium perchlorate
Potassium permanganate
Potassium peroxide
Silver nitrate
Sodium bromate
Sodium carbonate peroxide
Sodium chlorate
Sodium chlorite
Sodium dichloroisocyanurate
Sodium dichromate

Sodium hypochlorite
Sodium nitrate
Sodium nitrite
Sodium perchlorate
Sodium permanganate
Sodium peroxide
Strontium nitrate
Strontium peroxide
Sulfur trioxide
Trichloroisocyanuric acid
Uranyl nitrate
Urea nitrate
Zinc ammonium nitrate
Zinc nitrate
Zinc permanganate
Zinc peroxide
Zirconium picramate

GROUP 105 Reducing Agents, Strong

Aluminum borohydride
Aluminum carbide
Aluminum hydride
Aluminum hypophosphide
Ammonium hypophosphide
Ammonium sulfide
Antimony pentasulfide
Antimony trisulfide
Arsenic sulfide
Arsenic trisulfide
Arsine
Barium carbide
Barium hydride
Barium hypophosphide
Barium sulfide
Benzyl silane
Benzyl sodium
Beryllium hydride
Beryllium sulfide
Beryllium tetrahydroborate
Bismuth sulfide
Boron arsenotribromide
Boron trisulfide
Bromodiborane
Bromosilane
Butyl dichloroborane
n-Butyl lithium
Cadmium acetylide
Cadmium sulfide

GROUP 105 Reducing Agents, Strong
cont'd

Calcium
Calcium carbide
Calcium hexammoniate
Calcium hydride
Calcium hypophosphide
Calcium sulfide
Cerium hydride
Cerium trisulfide
Ceros phosphide
Cesium carbide
Cesium hexahydroaluminate
Cesium hydride
Cesium sulfide
Chlorodiborane
Chlorodiisobutyl aluminum
Chlorodimethylamine diborane
Chlorodipropyl borane
Chlorosilane
Chromium sulfide
Copper acetylde
Copper sulfide
Diborane
Diethyl aluminum chloride
Diethyl zinc
Diisopropyl beryllium
Dimethyl magnesium
Ferrous sulfide
Germanium sulfide
Gold acetylde
Gold sulfide
Hexaborane
Hydrazine
Hydrogen selenide
Hydrogen sulfide
Hydroxyl amine
Lead sulfide
Lithium aluminum hydride
Lithium hydride
Lithium sulfide
Magnesium sulfide
Manganese sulfide
Mercuric sulfide
Methyl aluminum sesquibromide
Methyl aluminum sesquichloride
Methyl magnesium bromide
Methyl magnesium chloride
Methyl magnesium iodide
Molybdenum sulfide
Nickel subsulfide

Pentaborane
Phosphine
Phosphonium iodide
Phosphorus (red amorphous)
Phosphorus (white or yellow)
Phosphorus heptasulfide
Phosphorus pentasulfide
Phosphorus sesquisulfide
Phosphorus trisulfide
Potassium hydride
Potassium sulfide
Silver acetylde
Silver sulfide
Sodium
Sodium aluminate
Sodium aluminum hydride
Sodium hydride
Sodium hyposulfite
Sodium sulfide
Stannic sulfide
Strontium monosulfide
Strontium tetrasulfide
Tetraborane
Thallium sulfide
Titanium sesquisulfide
Titanium sulfide
Triethyl aluminum
Triethyl stibine
Triisobutyl aluminum
Trimethyl aluminum
Trimethyl stibine
Tri-n-butyl borane
Trioctyl aluminum
Uranium sulfide
Zinc acetylde
Zinc sulfide

GROUP 106 Water and Mixtures Con-
taining Water

Aqueous solutions and mixtures
Water

GROUP 107 Water Reactive Substances

Acetic anhydride
Acetyl bromide
Acetyl chloride
Alkyl aluminum chloride

GROUP 107 Water Reactive Substances
cont'd

Allyl trichlorosilane
Aluminum aminoborohydride
Aluminum borohydride
Aluminum bromide
Aluminum chloride
Aluminum fluoride
Aluminum hypophosphide
Aluminum phosphide
Aluminum tetrahydroborate
Amyl trichlorosilane
Anisoyl chloride
Antimony tribromide
Antimony trichloride
Antimony trifluoride
Antimony triiodide
Antimony trivinyl
Arsenic tribromide
Arsenic trichloride
Arsenic triiodide
Barium
Barium carbide
Barium oxide
Barium sulfide
Benzene phosphorus dichloride
Benzoyl chloride
Benzyl silane
Benzyl sodium
Beryllium hydride
Beryllium tetrahydroborate
Bismuth pentafluoride
Borane
Boron bromodiiiodide
Boron dibromodiiiodide
Boron phosphide
Boron tribromide
Boron trichloride
Boron trifluoride
Boron triiodide
Bromine monofluoride
Bromine pentafluoride
Bromine trifluoride
Bromo diethylaluminum
n-Butyl lithium
n-Butyl trichlorosilane
Cadmium acetylde
Cadmium amide
Calcium
Calcium carbide
Calcium hydride

Calcium oxide
Calcium phosphide
Cesium amide
Cesium hydride
Cesium phosphide
Chlorine dioxide
Chlorine monofluoride
Chlorine pentafluoride
Chlorine trifluoride
Chloroacetyl chloride
Chlorodiisobutyl aluminum
Chlorophenyl isocyanate
Chromyl chloride
Copper acetylde
Cyclohexenyl trichlorosilane
Cyclohexyl trichlorosilane
Decaborane
Diborane
Diethyl aluminum chloride
Diethyl dichlorosilane
Diethyl zinc
Diisopropyl beryllium
Dimethyl dichlorosilane
Dimethyl magnesium
Diphenyl dichlorosilane
Diphenylmethane diisocyanate
Disulfuryl chloride
Dodecyl trichlorosilane
Ethyl dichloroarsine
Ethyl dichlorosilane
Ethyl trichlorosilane
Fluorine
Fluorine monoxide
Fluorosulfonic acid
Gold acetylde
Hexadecyl trichlorosilane
Hexyl trichlorosilane
Hydrobromic acid
Iodine monochloride
Lithium
Lithium aluminum hydride
Lithium amide
Lithium ferrosilicon
Lithium hydride
Lithium peroxide
Lithium silicon
Methyl aluminum sesquibromide
Methyl aluminum sesquichloride
Methyl dichlorosilane

GROUP 107 Water Reactive Substances
cont'd

Methylene diisocyanate	Sodium methylate
Methyl isocyanate	Sodium oxide
Methyl trichlorosilane	Sodium peroxide
Methyl magnesium bromide	Sodium-potassium alloy
Methyl magnesium chloride	Stannic chloride
Methyl magnesium iodide	Sulfonyl fluoride
Nickel antimonide	Sulfuric acid (>70%)
Nonyl trichlorosilane	Sulfur chloride
Octadecyl trichlorosilane	Sulfur pentafluoride
Octyl trichlorosilane	Sulfur trioxide
Phenyl trichlorosilane	Sulfuryl chloride
Phosphonium iodide	Thiocarbonyl chloride
Phosphoric anhydride	Thionyl chloride
Phosphorus oxychloride	Thiophosphoryl chloride
Phosphorus pentasulfide	Titanium tetrachloride
Phosphorus trisulfide	Toluene diisocyanate
Phosphorus (amorphous red)	Trichlorosilane
Phosphorus oxybromide	Triethyl aluminum
Phosphorus oxychloride	Triisobutyl aluminum
Phosphorus pentachloride	Trimethyl aluminum
Phosphorus sesquisulfide	Tri-n-butyl aluminum
Phosphorus tribromide	Tri-n-butyl borane
Phosphorus trichloride	Trioctyl aluminum
Polyphenyl polymethyl isocyanate	Trichloroborane
Potassium	Triethyl arsine
Potassium hydride	Triethyl stibine
Potassium oxide	Trimethyl arsine
Potassium peroxide	Trimethyl stibine
Propyl trichlorosilane	Tripropyl stibine
Pyrosulfuryl chloride	Trisilyl arsine
Silicon tetrachloride	Trivinyl stibine
Silver acetylde	Vanadium trichloride
Sodium	Vinyl trichlorosilane
Sodium aluminum hydride	Zinc acetylde
Sodium amide	Zinc phosphide
Sodium hydride	Zinc peroxide

APPENDIX 3. INDUSTRY INDEX AND LIST OF GENERIC NAMES OF WASTE-STREAMS

This appendix consists of two separate but related tables. Table 1 is the Industry Index which lists names of industries alphabetically with their corresponding Standard Industrial Classification (SIC) code numbers. Table 2 is the list of Generic Names of Wastestreams.

This appendix is used to determine the RGN of wastestreams when their compositions are not known specifically but are identified by their generic or common names. The SIC code number of one wastestream produced by a given industry is obtained from the Industry Index table (Table 1). This number is located in the List of Generic Names of Wastestreams (Table 2). Then the corresponding industry source, generic name of the waste, and its RGN are noted from the table. The process is repeated for the second waste. The RGN for the two types of wastes are entered in the compatibility worksheet (Figure 2) and the compatibility method in Section 4.

The primary references used in the compilation of the following tables are the same ones used in Appendix 1, namely Ref. 1, 7, 8, 10, 12, 13, 14, 32, 44, 52, and 77. The lists are in no way complete nor are the assignments of RGN to particular wastestreams absolute. Changes in manufacturing processes and practices may change the waste compositions thus resulting in different generic types of wastes.

TABLE 1. INDUSTRY INDEX TABLE

<u>Industry</u>	<u>SIC code</u>	<u>Industry</u>	<u>SIC code</u>
Chemical products, miscellaneous	289	Mining, bituminous coal and lignite	12
Chemicals, agricultural	287	Mining, metal	10
Chemicals, industrial inorganic	281	Paints, varnishes, lacquers, enamels	
Chemicals, industrial organic	286	and allied products	285
Drugs	283	Paper and allied products	26
Food and kindred products	20	Petroleum refining and related industries	29
Furniture and fixtures	25	Plastic materials and synthetic resins	282
Instruments, measuring		Printing, publishing and allied industries	27
analyzing and control	38	Rubber and miscellaneous plastic products	30
Leather and leather products	31	Services, business	73
Lumber and wood products	24	Services, electrical, gas and sanitary	49
Machinery, except electrical	35	Soap, detergents and cleaning preparations	284
Machinery, equipment and supplies		Stone, clay, glass and concrete products	32
electrical and electronic	36	Textile mill products	22
Metal industries, primary	33	Transportation equipment	37
Metal products, fabricated	34		

TABLE 2. GENERIC NAMES OF WASTESTREAMS

<u>SIC code</u>	<u>Industry source</u>	<u>Generic name of wastes</u>	<u>Reactivity group nos.</u>
10	Metal mining	Ore extraction wastes	1, 24
10	Metal mining	Ore flotation, leach, & electrolysis wastes	10, 24
12	Bituminous coal & lignite mining	Coal processing wastes	24, 31, 101

Table 2. (Continued)

SIC code	Industry source	Generic name of wastes	Reactivity group nos.
20	Food & kindred products	Coffee caffeine extraction chaff	17
20	Food & kindred products	Citrus pectin wastes	1, 4
22	Textile mill products	Cotton processing wastes	1, 10, 24
22	Textile mill products	Orlon production wastes	24, 31
22	Textile mill products	Wool processing wastes	1, 3, 24
22	Textile mill products	Textile dyeing & finishing wastewater sludge	17, 24
24	Lumber & wood products	Plywood production phenolic resin wastes	31
24	Lumber & wood products	Wood preserving spent liquors	15, 17, 24, 27, 31
24	Lumber & wood products	Softwood anti-stain process wastes	7, 17, 31
25	Furniture & fixtures	Furniture paint stripping wastes	10, 24, 101
26	Paper & allied products	Wood processing wastes	13, 16, 28, 29, 101
26	Paper & allied products	Chemical pulping wastes	1, 101
26	Paper & allied products	Dimethyl sulfate still bottoms	1
26	Paper & allied products	Paperboard productions wastes	24, 31
26	Paper & allied products	Paperboard caustic sludge	10, 33
26	Paper & allied products	Paper making & printing wastes	16, 24
27	Printing, publishing & allied ind.	Newspaper printing & equipment cleaning wastes	4, 14, 16, 29
27	Printing, publishing & allied ind.	Packaging materials paint sludge & solvent	4, 13, 24
27	Printing, publishing & allied ind.	Photofinishing wastes	10
27	Printing, publishing & allied ind.	Chromate printing wastes	24, 104
281	Industrial inorganic chemicals	Nitrous oxide mfg. wastes	10, 104
281	Industrial inorganic chemicals	Titanium dioxide mfg.-chloride process wastes	1, 24

Table 2. (Continued)

SIC code	Industry source	Generic name of wastes	Reactivity group nos.
281	Industrial inorganic chemicals	Acetylene mfg. sludge	10
281	Industrial inorganic chemicals	Industrial gas scrubber wastes	10
281	Industrial inorganic chemicals	Antimony oxide mfg. wastes	24, 33
281	Industrial inorganic chemicals	Antimony pentafluoride production wastes	15, 24
281	Industrial inorganic chemicals	Chromè & zinc pigments mfg. wastes	11, 24
281	Industrial inorganic chemicals	Hydrogen chloride mfg. wastes	1
281	Industrial inorganic chemicals	Chlorine fume control wastes	1
281	Industrial inorganic chemicals	Fluoride salt production wastes	15
281	Industrial inorganic chemicals	Mercuric cyanide mfg. wastes	11, 24
281	Industrial inorganic chemicals	Barium compounds mfg. wastes	11, 24, 33
281	Industrial inorganic chemicals	Dichromate production wastes	24
281	Industrial inorganic chemicals	Fluorine mfg. wastes	15, 104
282	Plastics materials & synthetics	Adhesives & coating mfg. wastes	10, 17, 19, 29
282	Plastics materials & synthetics	Polyvinyl acetate emulsion sludge	101, 103
282	Plastics materials & synthetics	Plywood liquid resin plant wastes	4, 5, 10, 31
282	Plastics materials & synthetics	Organic peroxide catalyst production wastes	3, 101
282	Plastics materials & synthetics	Latex mfg. wastes	13, 101, 103
282	Plastics materials & synthetics	Acrylic resin production wastes	3, 13, 26, 28, 103
282	Plastics materials & synthetics	Cellulose ester production wastes	1, 3, 4, 13, 14, 24, 103
282	Plastics materials & synthetics	Ethylene & vinyl chloride mfg. residue	17, 24, 29
282	Plastics materials & synthetics	Urea & melanine resin mfg. wastes	6, 10, 24
282	Plastics materials & synthetics	Vinyl resin mfg. wastes	17, 31
282	Plastics materials & synthetics	Adiponitrile production wastes	11, 26, 101, 103
282	Plastics materials & synthetics	Urethane mfg. wastes	16, 24
282	Plastics materials & synthetics	Synthetic rubber mfg. wastes	14, 16, 17, 27
282	Plastics materials & synthetics	Rayon fiber mfg. wastes	24
283	Drugs	Arsenic pharmaceutical wastes	24
283	Drugs	Blood plasma fractions production wastes	4

Table 2. (Continued)

SIC code	Industry source	Generic name of wastes	Reactivity group nos.
283	Drugs	Alkaloids extraction wastes	4, 16, 17, 19, 29, 101
283	Drugs	Mercurical pharmaceutical wastes	16, 24
283	Drugs	Antibiotic mfg. wastes	4, 13, 14, 19
284	Soaps & detergents	Chemical cleaning compounds mfg. wastes	24, 104
284	Soaps & detergents	Bleach & detergent mfg. wastes	10
285	Paints, varnishes, lacquers	Paint wash solvent wastes	101
285	Paints, varnishes, lacquers	Glycerin sludge	4
285	Paints, varnishes, lacquers	Solvent based paint sludge	11, 13, 16, 17, 19, 24, 101
285	Paints, varnishes, lacquers	Water based paint sludge	24, 101, 103
285	Paints, varnishes, lacquers	Lacquer paints mfg. wastes	13, 16, 19, 24
285	Paints, varnishes, lacquers	Putty & misc. paint products mfg. wastes	24, 101
286	Industrial organic chemicals	Benzene sulfonate phenol production waste	1, 16
286	Industrial organic chemicals	Phenol production wastes from cumene oxidation	17, 101
286	Industrial organic chemicals	Phenol production wastes from chlorination benzene	17, 31
286	Industrial organic chemicals	Organic dye mfg. wastes	1, 7, 24, 31
286	Industrial organic chemicals	Chromate pigments and dye wastes	7, 24, 27, 33
286	Industrial organic chemicals	Cadmium-selenium pigment wastes	24
286	Industrial organic chemicals	Nitrobenzene production wastes	27
286	Industrial organic chemicals	Toluene diisocyanate production wastes	18, 24, 101
286	Industrial organic chemicals	Pitch & creosote equipment cleaning wastes	10
286	Industrial organic chemicals	Chlorinated solvents refining wastes	4, 16, 17, 19
286	Industrial organic chemicals	Transformer oil mfg. wastes	17, 28
286	Industrial organic chemicals	Ethylene mfg. wastes by thermal pyrolysis	17, 31

Table 2. (Continued)

SIC code	Industry source	Generic name of wastes	Reactivity group nos.
286	Industrial organic chemicals	Ethylene chloride mfg. wastes from oxychlorination of ethylene	17
286	Industrial organic chemicals	Ethylene glycol mfg. wastes	4, 14, 17
286	Industrial organic chemicals	Freon mfg. wastes	1, 24
286	Industrial organic chemicals	Formaldehyde mfg. wastes	17, 24
286	Industrial organic chemicals	Epichlorohydrin mfg. wastes	4, 14, 17
286	Industrial organic chemicals	Mfg. wastes from n-butane dehydrogenation	17, 24, 33
286	Industrial organic chemicals	Acetaldehyde still bottoms from ethylene oxid.	5, 17
286	Industrial organic chemicals	Acetone mfg. wastes	17, 31
286	Industrial organic chemicals	Methanol mfg. wastes-carbon monoxide synthesis	17, 24
286	Industrial organic chemicals	Methyl methacrylate resin mfg. wastes	3, 13, 16, 26, 28, 31, 103
286	Industrial organic chemicals	Maleic anhydride production wastes	3, 4, 28, 103
286	Industrial organic chemicals	Lead alkyl production wastes	24
286	Industrial organic chemicals	Perchloroethylene production wastes	17, 28, 31
286	Industrial organic chemicals	Propylene glycol mfg. wastes	14, 17, 28
286	Industrial organic chemicals	Acrylonitrile production wastes	26, 101, 103
286	Industrial organic chemicals	Adipic acid production wastes-cyclohexane oxid.	3, 24
286	Industrial organic chemicals	Vinyl chloride mfg. wastes	17, 31
287	Agricultural chemicals	Buctril production caustic wash	3, 10, 16, 17, 31
287	Agricultural chemicals	DCP tar	17, 31
287	Agricultural chemicals	MCP production wastes	1, 3, 13, 17, 31
287	Agricultural chemicals	DDT formulation wastes	10, 16, 17
287	Agricultural chemicals	Arsenic pesticide formulation wastes	24
287	Agricultural chemicals	Atrazine production wastes	3, 10, 11
287	Agricultural chemicals	Malathion production wastes	16, 32
287	Agricultural chemicals	Parathion production wastes	1, 32
287	Agricultural chemicals	Trifluralin mfg. wastes	16, 17, 27

Table 2. (Continued)

SIC code	Industry source	Generic name of wastes	Reactivity group nos.
287	Agricultural chemicals	Phosphoric acid production wastes	1, 24
289	Misc. chemical products	TNT production wastes	8, 16, 24, 27, 102
289	Misc. chemical products	TNT red water wastes	3, 27, 102
289	Misc. chemical products	Penite production wastes	24
289	Misc. chemical products	Acidic cleaning compounds	1
29	Petroleum refining & related ind.	Coke product wastes	24, 101
29	Petroleum refining & related ind.	Catalyst wastes	24, 101
29	Petroleum refining & related ind.	Alkane production wastes	4, 7, 10, 16
29	Petroleum refining & related ind.	Wastewater treatment air floatation unit floc	10
29	Petroleum refining & related ind.	Spent caustic	10, 20, 24, 31, 33
29	Petroleum refining & related ind.	Dissolved air floatation emulsion	16, 24, 31, 33, 101
29	Petroleum refining & related ind.	Catacarb rinse water	24
29	Petroleum refining & related ind.	Catalyst sludge	10, 24
29	Petroleum refining & related ind.	API separator sludge	11, 16, 24, 31, 33, 101
29	Petroleum refining & related ind.	Liquified petroleum gas proc. wastes	16, 101
29	Petroleum refining & related ind.	VLE alkylation sludge	10, 15
29	Petroleum refining & related ind.	Fluid catalytic cracker fines	11, 16, 24, 31
29	Petroleum refining & related ind.	Spent lime from boiler feed water treatment	10, 24, 31
29	Petroleum refining & related ind.	HF alkylation sludge, neutralized	15, 24, 31, 101
29	Petroleum refining & related ind.	Non-leaded gasoline tank bottoms	16, 24, 31, 101
29	Petroleum refining & related ind.	Leaded-gasoline tank bottoms	16, 24, 31, 101
29	Petroleum refining & related ind.	Refinery storm water run off silt	11, 16, 24, 31, 101
29	Petroleum refining & related ind.	Waste biodegradation sludge	11, 24, 31
29	Petroleum refining & related ind.	Coke fines	24, 31
29	Petroleum refining & related ind.	Lube oil filter clays	16, 24, 31
29	Petroleum refining & related ind.	Kerosene filter clays	16, 24, 31, 101
29	Petroleum refining & related ind.	Cooling tower sludge	11, 16, 24, 31, 101
29	Petroleum refining & related ind.	Slop oil emulsion solids	16, 24, 31, 101
29	Petroleum refining & related ind.	Exchange bundle cleaning sludge	16, 24, 31, 101

Table 2. (Continued)

SIC code	Industry source	Generic name of wastes	Reactivity group nos.
29	Petroleum refining & related ind.	Once through cooling water sludge	24, 31, 101
29	Petroleum refining & related ind.	Crude tank bottoms	16, 24, 31, 101
29	Petroleum refining & related ind.	Sour refinery waste	10, 11, 20, 31, 33
29	Petroleum refining & related ind.	Still bottoms	24
29	Petroleum refining & related ind.	Waste brine sludge	24
29	Petroleum refining & related ind.	Gasoline blending wastes	24, 101
29	Petroleum refining & related ind.	Soda ash alkaline solution	10
29	Petroleum refining & related ind.	Acid sludge	1
29	Petroleum refining & related ind.	Caustic cleaning solution	10
29	Petroleum refining & related ind.	Alky spent caustic	10
29	Petroleum refining & related ind.	Lime sludge from raw water treatment	10
29	Petroleum refining & related ind.	Lube oil & grease reclaimer's residue	24
29	Petroleum refining & related ind.	Waste lube oil & grease	24
29	Petroleum refining & related ind.	Recycled oil spent sulfuric acid	1
29	Petroleum refining & related ind.	Recycled oil acid sludge	1, 16, 28
29	Petroleum refining & related ind.	Recycled oil caustic sludge	10, 24
29	Petroleum refining & related ind.	Recycled oil spent clays	101
29	Petroleum refining & related ind.	Recycled oil still bottoms	31
29	Petroleum refining & related ind.	Recycled oil wastewater	31
30	Rubber & misc. plastic products	Tires & inner tube mixing process wastes	17, 24, 101
30	Rubber & misc. plastic products	Tires & inner tube mixing preparation wastes	18
30	Rubber & misc. plastic products	Tires & inner tube cleaning process wastes	17
30	Rubber & misc. plastic products	Tires & inner tube mfg. wastes	5, 16, 17, 24, 28
30	Rubber & misc. plastic products	Medical product washings	4
30	Rubber & misc. plastic products	Medical product dispersion casting	16
31	Leather and leather products	Tanning solvents	4, 19
31	Leather and leather products	Sulfide dehairing sludges	33
31	Leather and leather products	Tanning wastes	10, 13, 24, 101
31	Leather and leather products	Chrome tan liquor	24, 33

Table 2. (Continued)

SIC code	Industry source	Generic name of wastes	Reactivity group nos.
32	Stone, clay, glass & concrete prod.	Glass etching wastes	1, 4
32	Stone, clay, glass & concrete prod.	Mirror production wastes	24
32	Stone, clay, glass & concrete prod.	Piezoelectric ceramics compounding process wastes	24
32	Stone, clay, glass & concrete prod.	Piezoelectric ceramics calcining process wastes	24
32	Stone, clay, glass & concrete prod.	Piezoelectric ceramics grinding wastes	24
32	Stone, clay, glass & concrete prod.	Piezoelectric ceramics pressing wastes	24
32	Stone, clay, glass & concrete prod.	Piezoelectric ceramics polarization wastes	24
33	Primary metal industries	Steel mfg. waste oil	24, 101
33	Primary metal industries	Stainless steel pickling liquor	1, 2, 24
33	Primary metal industries	Pig iron production wastes	10, 11, 31
33	Primary metal industries	Steel finishing wastes	11, 24
33	Primary metal industries	Steel mfg. wastes	1, 24, 31
33	Primary metal industries	Coke plant raw waste sludge	7, 11, 16, 31
33	Primary metal industries	Carbon tubing undercoating process wastes	3, 24
33	Primary metal industries	Metal smelting & refining wastes	1, 24
33	Primary metal industries	Spent battery acid	1
33	Primary metal industries	Barium compounds smelting & refining wastes	24
33	Primary metal industries	Aluminum scrap melting wastes	23, 25, 107
33	Primary metal industries	Metal reclaiming wastes	1, 2, 24
33	Primary metal industries	Brass mill wastes	1, 24, 104
33	Primary metal industries	Aluminum extrusion solvents	4
33	Primary metal industries	Aluminum degreasing solvents	19
33	Primary metal industries	Aluminum fluodizing process wastes	1
33	Primary metal industries	Aluminum extrusion equipment cleaning wastes	10, 101
33	Primary metal industries	Aluminum foundry wastes	15, 101
33	Primary metal industries	Wire & cable fiber spinning wash	1
33	Primary metal industries	Wire & cable spent scrubber solution	15

Table 2. (Continued)

SIC code	Industry source	Generic name of wastes	Reactivity group nos.
34	Fabricated metal products	Metal cleaning wastes	1, 2, 3, 24
34	Fabricated metal products	Can mfg. wastes	1, 29, 101
34	Fabricated metal products	Steel pickling bath wastes	1
34	Fabricated metal products	Metal drum reconditioning wastes	10, 24
34	Fabricated metal products	Submerged burnishing wastes	11, 24
34	Fabricated metal products	Acid plating solution	2
34	Fabricated metal products	Programate sludge	10, 11, 24
34	Fabricated metal products	Metal stripping wastes	11, 24
34	Fabricated metal products	Plating rack stripping wastes	2
34	Fabricated metal products	Oxidizing sludge	24
34	Fabricated metal products	Plating wastes	11, 24
34	Fabricated metal products	Steel fabrication waste oil	101
34	Fabricated metal products	Metal plating degreasing solvents	19, 101
34	Fabricated metal products	Copper plating wastes	11, 24
34	Fabricated metal products	Brass plating wastes	11, 24
34	Fabricated metal products	Aluminum anodizing wastes	1, 24
34	Fabricated metal products	Chrome plating wastes	11, 24
34	Fabricated metal products	Metal coating phosphate sludge	24, 101
34	Fabricated metal products	Aluminum pickling bath	1, 2
34	Fabricated metal products	Nickel stripping wastes	11
34	Fabricated metal products	Anodizing tank wastes	1
34	Fabricated metal products	Chemical milling spent caustic	10, 24, 33
34	Fabricated metal products	Galvanizing pickling bath	10
34	Fabricated metal products	Galvanizing wastes	1
34	Fabricated metal products	Wire products metal milling wastes	1, 2, 24
34	Fabricated metal products	Rolling mill solvents	24, 101
35	Machinery except electrical	Rotogravure printing plate wastes	10, 24
35	Machinery except electrical	Duplicating & photoequipment mfg. wastes	10, 24
35	Machinery except electrical	Electric circuits mfg. acid solution	1, 2, 24
35	Machinery except electrical	Electric circuits mfg. solvents	4, 16, 19

Table 2. (Continued)

SIC code	Industry source	Generic name of wastes	Reactivity group nos.
35	Machinery except electrical	Chromic acid bath	1, 24, 104
35	Machinery except electrical	Electric computer metal plating wastes	1, 2, 24
35	Machinery except electrical	Computer mfg. wastes	11, 15, 17, 24, 101
35	Machinery except electrical	Machinery chemical milling acids	1, 2, 24
36	Electrical & electronic equip. & sup.	Electronic equipment dip & cleaning wastes	10, 17, 24, 101
36	Electrical & electronic equip. & sup.	Electronic components plating wastes	1, 2, 24
36	Electrical & electronic equip. & sup.	Fiberglass form mfg. wastes	17, 19, 101
36	Electrical & electronic equip. & sup.	Electronic components mfg. solvents	4, 13, 16, 17, 19, 101
36	Electrical & electronic equip. & sup.	Machine parts cleaning solvents	4, 17, 19
36	Electrical & electronic equip. & sup.	Electronic components etching solution	10, 15
36	Electrical & electronic equip. & sup.	Copper plating cyanide stripping solution	11
36	Electrical & electronic equip. & sup.	T.V. picture tube mfg. wastes	1, 2
36	Electrical & electronic equip. & sup.	Miniature equip. chemical milling wastes	10, 16
36	Electrical & electronic equip. & sup.	Telephone answering device mfg. wastes	4, 17
36	Electrical & electronic equip. & sup.	Electronic tube production wastes	1, 24
36	Electrical & electronic equip. & sup.	Metal finishing wastewater treatment sludge	10, 24
36	Electrical & electronic equip. & sup.	Semi-conductor mfg. wastes	1, 2, 24, 104

Table 2. (Continued)

SIC code	Industry source	Generic name of wastes	Reactivity group nos.
36	Electrical & electronic equip. & sup.	Silicon etching solution	1, 2
36	Electrical & electronic equip. & sup.	Electronic components paint sludge	4, 16, 19, 101, 107
36	Electrical & electronic equip. & sup.	Ceramic capacitor production waste solvent	16, 17, 19
36	Electrical & electronic equip. & sup.	Magnetic tape mfg. wastes	24, 104
36	Electrical & electronic equip. & sup.	Magnetic recorder head laminating proc. wastes	4, 14, 17, 19
36	Electrical & electronic equip. & sup.	Battery reclamation wastes	1
36	Electrical & electronic equip. & sup.	Storage battery mfg. wastes	10, 24
37	Transportation equipment	Automobile paint application & clean up wastes	24, 31
37	Transportation equipment	Automobile electro deposition primer paint wastes	19, 24, 31
37	Transportation equipment	Automobile paint sludge	10, 24, 31
37	Transportation equipment	Automobile mfg. wastewater treatment residue	24, 31
37	Transportation equipment	Aircraft alkaline cleaning solution	10, 104
37	Transportation equipment	Aircraft aluminum etching wastes	10, 33
37	Transportation equipment	Aircraft parts acid plating wastes	1, 24, 104
37	Transportation equipment	Aircraft parts anodizing wastes	1
37	Transportation equipment	Chrome plating wastes	24, 104
37	Transportation equipment	Aluminum hot-seal wastes	24, 104
37	Transportation equipment	Chrome destruct sludge	10, 24
37	Transportation equipment	Rail car metal cleaning wastes	1, 24, 101
38	Measuring, analyzing & controlling instruments	Chlorinated cleaning solvents	17
38	Measuring, analyzing & controlling instruments	Microfilm production wastes	4, 14, 19

Table 2. (Continued)

SIC code	Industry source	Generic name of wastes	Reactivity group nos.
38	Measuring, analyzing & controlling instruments	Graphic arts adhesive mfg. wastes	16, 28, 101
49	Electric gas & sanitary service	Askarel liquid	17
73	Business services	Printed circuit board laboratory wastes	24
73	Business services	Photographic fixing solution	10, 11
73	Business services	Film processing acid wastes	3, 5
73	Business services	Ship line flush wastes	4, 10, 13, 16
73	Business Services	Equipment & floor cleaning caustic wastes	10
73	Business services	Acidic chemical cleaning solution	1
73	Business services	Railroad equipment cleaning caustic wastes	10, 101
73	Business services	Boiler wash	1
73	Business services	Solvent recovery tank bottoms	4, 19, 24, 101
73	Business services	Solvent recovery sludge	4, 17, 19, 27, 101
73	Business services	Chlorinated solvent recovery still bottoms	17, 24, 101

TABLE 3

ANTICIPATED RESPONSE ACTIONS FOR CERTAIN COMPOUNDS

	Restrict Access	Restrict Ignition	Evacuate	Restrict Human Use	Restrict Farm Use	Restrict Industrial Use	Contain	Reference Key to Special Precautions/Information
Acetaldehyde	X	X	X	X				1,2
Acetic Acid						X		1,2
Acetic Anhydride						X		1,2
Acetone	X	X						1,3,4
Acetonitrile	X	X		X		X		1,2
Acetophenone				X			X	2,9
Acetyl Bromide	X		X	X		X		1,2,5,8,11
Acetyl Chloride	X	X	X			X		1,2,3,5,8,11
Acetylene	X	X	X					1,4,6,20
Acrolein	X	X	X	X	X	X		1,2,5,6
Acrylamide	X			X	X	X		1,2
Acrylonitrile	X	X	X	X	X	X	X	1,2,5,12,19
Aldrin	X			X	X	X	X	1,2,9,12
Alkyl Benzene Sulfonic Acids	X							2,18
Allyl Alcohol	X	X		X				1,2,3,5,12
Allyl Chloride	X	X		X				1,2,5,12
Aluminum Chloride				X		X		1,2,5,8,11
Aluminum Fluoride								1,12
Aluminum Nitrate	X	X				X		1,2
Ammonia, anhydrous	X		X	X				1,2,5,11,20

ANTICIPATED RESPONSE ACTIONS FOR CERTAIN COMPOUNDS

	Restrict Access	Restrict Ignition	Evacuate	Restrict Human Use	Restrict Farm Use	Restrict Industrial Use	Contain	Reference Key to Special Precautions/Information
Ammonium Bifluoride	X			X	X			1,2,18
Ammonium Chloride				X				1,2
Ammonium Dichromate	X	X		X	X	X		1,2,3,7,8,12,21
Ammonium Fluoride	X				X	X		1,2,18
Ammonium Hydroxide**	X		X	X				1,2
Ammonium Molybdate	X			X	X			7,12
Ammonium Nitrate	X	X		X		X		
Ammonium Oxalate	X			X	X			1,2
Ammonium Pentaborate	X				X			1,2
Ammonium Perchlorate	X	X		X		X		2,7
Ammonium Sulfide	X	X	X	X	X	X		1,2,5,6,8,12
Ammonium Thiocyanate	X			X	X			1,2
Amyl Acetate	X	X				X	X	1,2
Is-Amyl Nitritelfonic Acids	X	X	X		X	X	?	1,2,3,5,6,8,12,19
n-Amyl Alcohol	X	X				X	X	1,3
n-Amyl Nitrate	X	X			X	X	?	1,2,12,21
n-Amyltrichlorosilane	X		X			X		1,2,8,11,12,18,21
Aniline	X				X	X	X	1,2,12,19
Antimony Pentachloride	X		X	X	X	X		1,2,8,18

**Dilute and disperse only when other corrective methods cannot be used.

ANTICIPATED RESPONSE ACTIONS FOR CERTAIN COMPOUNDS

	Restrict Access	Restrict Ignition	Evacuate	Restrict Human Use	Restrict Farm Use	Restrict Industrial Use	Contain	Reference Key to Special Precautions/ Information
Antimony Trioxide	X							1,2
Arsenic Acid	X			X	X	X		1,2,18
Arsenic Trichloride	X		X	X	X	X		1,2,5,8,18
Arsenic Trioxide	X			X	X	X		1,2
Barium Chlorate	X	X	X	X	X			1,2,7
Barium Nitrate	X	X		X	X			1,2,7
Barium Perchlorate	X	X	X	X	X			1,2,7
Benzaldehyde	X			X			X	1,2
Benzene	X	X		X		X	X	1,2,4,15
Benzophenone							X	2
Benzoyl Chloride	X			X		X	X	1,2,5,11,12,18
Beryllium, metallic	X	X						1,2,21
Beryllium Nitrate	X	X		X	X	X		1,2,18,21
Beryllium Oxide	X	X		X	X	X		1,2,21
Boron Trichloride	X		X			X		1,2,5,8,11,18,21
Bromine	X		X	X	X	X		1,2,5,8
Butadiene, inhibited	X	X	X			X		1,2,4,6,20
Butane	X	X	X			X		1,2,4,6,20
1,4-Butanediol				X	X			2
n-Butyl Acetate	X	X					X	1,2,19

ANTICIPATED RESPONSE ACTIONS FOR CERTAIN COMPOUNDS

	Restrict Access	Restrict Ignition	Evacuate	Restrict Human Use	Restrict Farm Use	Restrict Industrial Use	Contain	Reference Key to Special Precautions/ Information
n-Butyl Alcohol	X	X						3
Butylamine	X	X	X	X	X	X		1,2,5,6
Butylene Oxide	X	X	X	X	X	X		1,2,3,4,5,6,14
tert-Butyl Hydroperoxide	X	X		X		X		1,2,7
N-Butyl Mercaptan	X	X	X			X	?	1,2,5,6,12
Butyraldehyde	X	X		X			X	1,2
Cadmium Nitrate	X	X		X	X	X		1,2,3,7
Calcium Carbide	X	X	X	X				2,10,11
Calcium Chlorate	X	X	X	X	X			1,2,7
Calcium Chromate	X			X	X			1,2
Calcium Cyanide	X		X	X	X	X		1,2,5,21
Calcium Hypochlorite	X			X		X		1,2
Calcium, metallic	X	X	X					2,8,10,21
Carbon Bisulfide	X	X	X	X	X	X		1,2,5,6,12
Carbon Monoxide	X	X	X					1,5,6,14,20,21
Carbon Tetrachloride	X			X			X	1,2,5
Caustic Soda Solution	X			X	X	X		2,8
Chlordane	X				X	X	X	1,2,9,12
Chlorine	X		X	X	X	X		1,2,5,8,11,20
Chlorine Trifluoride	X		X	X	X	X		1,2,5,7,8,11,20,21

ANTICIPATED RESPONSE ACTIONS FOR CERTAIN COMPOUNDS

	Restrict Access	Restrict Ignition	Evacuate	Restrict Human Use	Restrict Farm Use	Restrict Industrial Use	Contain	Reference Key to Special Precautions/Information
Chlorobenzene	X	X		X			X	1,2,12
Chloroform	X			X		X	X	1,2,12
Chloromethyl Methyl Ether	X	X	X	X	X	X	?	1,2,3,5,6,7,10,12,18
Chloropicrin, liquid	X		X	X	X	X		1,2,5,8,21
Chlorosulfonic Acid	X		X	X	X	X		1,2,5,8,11
Chromyl Chloride	X		X	X	X	X		1,2,5,6,7,11,18
Chlodian	X	X	X			X	?	1,5,6,12
Copper Nitrate	X	X			X	X		1,2,3,7
Cresols	X			X	X	X	X	1,2,12
Crotonaldehyde	X	X		X				1,2
Cumene Hydroperoxide	X	X			X	X	X	1,2,3,8,12,21
Cyanogen	X	X	X	X	X	X		1,2,5,6,12,20
Cyanogen Bromide	X		X	X	X	X		1,2,5,12
Cyanogen Chloride	X		X	X	X	X		1,2,5,12,20
Cyclohexane	X	X		X		X	X	1,2,4
Cyclohexanone				X			X	1,2,19
Cyclohexylamine				X	X		X	1,2,19
Cyclopentane	X	X	X			X	?	1,2,4,6,14
Cyclopropane	X	X	X				X	1,2,4,6,14,20

ANTICIPATED RESPONSE ACTIONS FOR CERTAIN COMPOUNDS

	Restrict Access	Restrict Ignition	Evacuate	Restrict Human Use	Restrict Farm Use	Restrict Industrial Use	Contain	Reference Key to Special Precautions/ Information
DDD	X			X	X		X	1,2
DDT	X	X		X	X	X	X	2,9
Decaborane	X	X		X	X	X	X	1,2,4,15
Diazinon	X			X	X	X		1,2,3,9,12
Dibenzoyl Peroxide	X	X		X	X			1,2,7
Dichlorobenzene				X			X	2,12
Dichlorodifluoromethane (Freon 22)	X							1
1,2-Dichloroethylene	X	X	X			X		1,2,3,5,6,9,12
Dichloromethane	X			X		X	X	1,2,12
2,4-Dichlorophenoxy Acetic Acid	X			X	X		X	1,2
Dichloropropane	X	X		X			X	1,2,12
Diethylzinc	X	X	X					1,2,8,10,21
Dimethylamine	X	X	X	X				1,2,3,20
Dimethyldichlorosilane	X	X	X			X		1,2,3,5,6,8,11
Dimethylformamide	X	X	X	X	X	X		1,2
1,1-Dimethylhydrazine	X	X	X	X	X	X		1,2,5,12
Dimethyl Sulfate	X		X	X	X	X		1,2,8,12
Dimethyl Sulfide	X	X	X	X		X	?	1,2,5,6,12,19
Dimethylzinc	X	X	X				X	1,2,6,8,10,21

ANTICIPATED RESPONSE ACTIONS FOR CERTAIN COMPOUNDS

	Restrict Access	Restrict Ignition	Evacuate	Restrict Human Use	Restrict Farm Use	Restrict Industrial Use	Contain	Reference Key to Special Precautions/Information
2,4-Dinitroaniline	X		X	X			X	1,2,12
Dinitrobenzene	X	X		X	X		X	1,2,3,21
2,4-Dinitrophenol	X			X			X	1,2,12
2,4-Dinitrotoluene	X	X		X	X		X	1,2,3,21
1,4-Dioxane	X	X		X				1,2,3
Endrin	X			X	X		X	1,2,12
Ethyl Acetate or methane	X	X		X			X	1,2
Ethyl Acrylate	X	X		X			X	1,2,19
Ethyl Alcohol	X	X						3
Ethylaluminum Dichloride	X	X	X			X		1,2,3,5,6,8,10,11,18,21
Ethylamine	X	X	X	X	X	X		1,2,5,6,8,12,20
Ethylbenzene	X	X		X			X	1,2,19
Ethyl Chloroformate	X	X	X	X	X	X		1,2,3,8,12,18
Ethyldichlorosilane	X	X	X			X		1,2,3,5,6,8,11,18,21
Ethylene	X	X	X					1,2,4,6,20
Ethylene Glycol								None
Ethylene Glycol Monoethyl Ether				X				2
Ethylene Glycol Monomethyl Ether				X				2

ANTICIPATED RESPONSE ACTIONS FOR CERTAIN COMPOUNDS

	Restrict Access	Restrict Ignition	Evacuate	Restrict Human Use	Restrict Farm Use	Restrict Industrial Use	Contain	Reference Key to Special Precautions/Information
Ethyl Formate	X	X	X	X	X	X		1,2,3,5,6
Ethyleneimine	X	X	X	X	X			1,2,5
Ethylene Oxide	X	X	X					1,2,6,20
Ethyl Ether	X	X	X			X		1,2,4,6,14
Ethyl Mercaptan	X	X	X	X		X	?	1,2,5,6,12,19
Ferric Nitrate	X	X				X		1,2,3,7
Fluorine	X		X	X	X	X		1,2,5,8,20
Fluosulfonic Acid	X		X			X		1,2,5,8,11,18
Formaldehyde Solution	X			X	X			1,2
Formic Acid	X							1,2,8
Fumaric Acid								1,2
Furfural	X			X	X			1,2
Furfuryl Alcohol	X			X	X			1,2
Heptachlor	X			X	X	X	X	1,2,21
Heptane	X	X	X			X	X	1,2,4,15
Heptanol		X					X	
Hexane	X	X	X			X	X	1,2,4,15
Hydrazine	X	X	X	X	X	X		1,2,5,6
Hydrochloric Acid	X		X	X	X	X		1,2,8
Hydrofluoric Acid	X		X	X	X	X		1,2,8,20

ANTICIPATED RESPONSE ACTIONS FOR CERTAIN COMPOUNDS

	Restrict Access	Restrict Ignition	Evacuate	Restrict Human Use	Restrict Farm Use	Restrict Industrial Use	Contain	Reference Key to Special Precautions/Information
Hydrogen Bromide	X		X			X		1,2,5,8,18,20
Hydrogen Chloride	X		X	X	X	X		1,2,5,8,11,20
Hydrogen Cyanide	X	X	X	X	X	X		1,2,5,11,20
Hydrogen Peroxide	X		X	X		X		1,2,7
Hydrogen Sulfide	X	X	X	X	X	X		1,5,20
Hydroquinonete	X			X	X			1,2
Isobutane	X	X	X			X		1,4,6,14,20
Isobutyl Acetated	X	X					X	1,2
Isobutyl Alcohol	X	X		X			X	1,2,3
Isobutylamine	X	X	X	X	X	X		1,2,5,6,8
Isobutyronitrile	X	X	X			X	?	1,2,5,6,12
Isopentane	X	X	X			X	X	1,2,4
Isopropyl Alcohol	X	X						1
Isopropylamine	X	X	X	X	X	X		1,2,5,6,12
Isopropyl Mercaptan	X	X	X	X	X	X		1,2,5,6,12
Isovaleraldehyde	X	X	X		X	X	?	1,2,4,5,6,14
Lauroyl Peroxide	X	X	X		X	X	X	2,7,17,21
Lauryl Mercaptan	X			X			X	1,2,12
Lead Nitrate	X	X		X	X	X		1,2,7
Lead Tetracetate	X	X		X	X	X		1,2,3,7,8

ANTICIPATED RESPONSE ACTIONS FOR CERTAIN COMPOUNDS

	Restrict Access	Restrict Ignition	Evacuate	Restrict Human Use	Restrict Farm Use	Restrict Industrial Use	Contain	Reference Key to Special Precautions/Information
Lead Thiocyanate	X			X	X		1,2	
Liquified Natural Gas	X	X	X					1,2,4,6,14,20
Liquified Petroleum Gas	X	X	X					1,2,4,6,14,20
Lithium Aluminum Hydride	X	X	X	X	X	X		2,8,10,11
Lithium Hydride	X	X	X					1,2,3,5,6,7,8,11,16,21
Lithium, metallic	X	X	X					1,2,3,5,6,7,8,11,16,21
Magnesium		X						21
Magnesium Perchlorate	X	X	X		X	X		1,2,7,21
Malathion	X			X	X	X	X	1,2,9,12
Mercuric Nitrate	X	X		X	X	X		1,2,3,7,21
Mercury	X						X	2,13
Mesityl Oxide	X	X		X	X	X	?	1,2,3,4,8,14,1
Methaneylamine	X	X	X					1,2,4,6,14,20
Methoxychlor	X			X		X	X	1,2
Methyl Acetate	X	X	X	X	X	X		1,2,3,5,6
Methyl Acrylate	X	X	X	X	X			1,2
Methyl Alcohol	X	X						1,2,3
Methylamine	X	X	X	X	X	X		1,2,3,5,6,8,12
Methyl Bromide	X		X	X				1,2,5,12,20

ANTICIPATED RESPONSE ACTIONS FOR CERTAIN COMPOUNDS

	Restrict Access	Restrict Ignition	Evacuate	Restrict Human Use	Restrict Farm Use	Restrict Industrial Use	Contain	Reference Key to Special Precautions/Information
Methyl Chloride	X	X	X	X				1,2,5,12,20
Methyl Chloroformate	X	X	X	X	X	X		1,2,3,8,12,18
Methylcyclopentane	X	X	X			X	?	1,2,4,6,14
Methyldichlorosilane	X	X	X			X		1,2,3,5,6,8,11,18,21
Methyl Ethyl Ketone	X	X		X				1,2
Methyl Formate	X	X	X	X		X		1,2,3,5,6,12
Methylhydrazine	X	X	X	X	X	X		1,2,3,5,6,8,21
Methyl Isobutyl Ketone				X			X	1,2,19
Methyl Mercaptan	X	X	X	X		X		1,2,3,4,5,6,20
Methyl Methacrylate	X	X	X	X	X	X		1,2
Methyl Vinyl Ketone	X	X	X	X	X	X		1,2,3,5,6,8,21
Nickel Carbonyl	X	X	X	X	X	X		1,2,3,5,6,8,9,12
Nickel Nitrate	X	X			X	X		1,2,7
Nicotine	X			X	X	X		1,2,12
Nitric Acid	X		X	X	X	X		1,2,5,7,8
Nitrobenzene	X			X	X	X		2,12
Nitrogen, liquified	X							2,20
Nitrogen Tetroxide	X		X	X	X	X		1,2,5,8,20
Nitromethane	X	X		X				1,3

ANTICIPATED RESPONSE ACTIONS FOR CERTAIN COMPOUNDS

[illegible]

ANTICIPATED RESPONSE ACTIONS FOR CERTAIN COMPOUNDS

	Restrict Access	Restrict Ignition	Evacuate	Restrict Human Use	Restrict Farm Use	Restrict Industrial Use	Contain	Reference Key to Special Precautions/Information
Phosphorus, red	X	X		X				2,12
Phosphorus Tribromide	X		X			X		1,2,5,8,11,18
Phosphorus Trichloride	X		X	X	X	X		1,2,5,11,18
Phosphorus, white	X	X	X	X				1,2,5,12
Polychlorinated Biphenyl	X			X	X		X	2
Polyphosphoric Acid	X							2,8
Potassium Arsenate	X			X	X			1,21
Potassium Chlorate	X	X		X	X	X		1,2,7,21
Potassium Chromate	X	X		X	X	X		1,2,7,8,21
Potassium Hydroxide	X							1,2,8
Potassium, metallic	X	X						2,7,16
Potassium Peroxide	X	X	X					1,2,7,8,11,21
Propane	X	X	X					1,2,4,6,14,20
Propionaldehyde	X	X		X				1,2
Propylene Oxide	X	X	X					1,2,3
Propyleneimine, inhibited	X	X	X	X	X	X		1,2,5,6,8,12
Propyl Alcohol	X	X						1,3
Pyridine	X	X	X	X				1,2,3,5
Resorcinol	X			X	X			1,2
Silicon Tetrachloride	X		X			X		1,2,5,11,18

ANTICIPATED RESPONSE ACTIONS FOR CERTAIN COMPOUNDS

	Restrict Access	Restrict Ignition	Evacuate	Restrict Human Use	Restrict Farm Use	Restrict Industrial Use	Contain	Reference Key to Special Precautions/Information
Toluene	X	X		X			X	1,2,4,15
Toluene 2,4-Diisocyanate	X			X	X			1,2,12
o-Toluidine	X	X		X	X	X		1,2,12,19
Trichloroethaneide	X						X	1,2,12
Trichloroethylene	X			X	X		X	1,2,12
Trichlorosilane	X	X	X					1,2,3,5,6,8,11,12,18,21
Triethylamine	X	X		X				1,2
Trifluorochloroethylene	X	X	X					1,2,5,6,12,20,21
Trimethylamine	X	X	X					1,2,5,20
Triethylaluminum	X	X	X					1,2,5,6,8,10,15,2
Uranyl Nitrate	X	X	X	X	X	X		1,2,3,7,18,21
Urea								
Valeraldehyde	X	X						1,2
Vanadium Oxytrichloride	X			X	X	X		1,2,5,8,11,18
Vanadium Pentoxide	X				X			1,2
Vinyl Acetate	X	X	X	X				1,2
Vinyl Chloride	X	X	X	X				1,2,12,20
Vinyl Fluoride, inhibited	X	X	X					1,2,6,12,20
Vinyl Methyl Ether, inhibited	X	X	X			X		1,2,4,5,6,12,20

ANTICIPATED RESPONSE ACTIONS FOR CERTAIN COMPOUNDS

	Restrict Access	Restrict Ignition	Evacuate	Restrict Human Use	Restrict Farm Use	Restrict Industrial Use	Contain	Reference Key to Special Precautions/ Information
Vinyltrichlorosilane	X	X	X	X		X	X	1,2,3,5,8,11,12 18,20
Xylene	X	X		X	X		X	1,2,4,15
Zinc Arsenate	X			X	X	X		1,2,21
Zinc Borate	X							1,2

REFERENCY KEY TO RESPONSE INDEX

1. Avoid inhalation. Vapors or dust are irritating or toxic.
2. Avoid direct contact. Contact with skin or eyes can cause irritation or burns.
3. No ignition hazard once material is dissolved, reacted, or covered with water.
4. Burning may be prohibited by anti-air pollution laws and regulations.
5. Poisonous gas or vapor danger. Substance is highly volatile.
6. Flammable or explosive gas or vapor danger. Substance is highly volatile.
7. Powerful oxidant - explosion and/or fire hazard in the presence of organic matter.
8. Highly corrosive, particularly to eyes and skin.
9. Sorbs strongly on bottom sediments. Substance is not at all soluble or reactive.
10. Reacts with water to form explosive or flammable gas or vapor.
11. Water reactive compound which reacts vigorously or violently.
Disperse or neutralize contaminated waters after reaction subsides.

12. Burning not recommended; fire difficult to control and/or poisonous gas is formed.
13. Cover with organic sulfur-containing compounds or free sulfur.
14. Clean burning.
15. Sooty burning.
16. DO NOT ADD water to chemical; AFTER the chemical has reacted with water, the resulting alkaline solution can be diluted.
17. Floating solids.
18. Strong acid formed in water.
19. First try to contain and skim; THEN dilute and disperse what has dissolved in water.
20. Chemical shipped as gas or liquified compressed gas; depending on atmospheric conditions, a large portion of the hazard will be dissipated with no action necessary.
21. Has unusual fire or toxicity hazards. See the hazardous chemical data sheets for chemical.
22. May float or sink as insoluble substance or dissolve like miscible substance. See the hazardous chemical data sheets for chemical.

RESPONSE DEFINITIONS

A. CAUTIONARY RESPONSES

1. Restrict Access - This response is invoked when appreciable danger arises from a flammable or toxic spill, and the general public (spectators) should be kept from the spill area. Access is restricted if ignition is considered possible (restrict ignition), or if evacuation is recommended.
2. Restrict Ignition - This response is invoked when chemicals are involved which develop flammable vapors.
3. Evacuate - This response is invoked when there is a very real danger that a highly flammable or toxic spill may spread, or develop a detrimental reaction with water. This category includes flammable chemicals and extremely toxic chemicals, e.g., poisonous gases.
4. Restrict Human Use - This response is invoked when mostly soluble substances or those which are exceptionally toxic are involved in a spill. The primary danger is that of ingesting the chemicals in drinking water.
5. Restrict Farm Use - This response is invoked when a toxic chemical contaminant is spilled in water used for irrigation or animals.
6. Restrict Industrial Use - This response is invoked when the spill contains chemicals which could corrode machinery, or if the possibility of ignition from highly flammable organics is developed. Those chemicals which upon heating could release poisonous gases could also cause this response to be invoked; as could those which might form an insulating film on internal boiler surfaces.

REACTIVITY GROUPS

1. Non-Oxidizing Mineral Acids

Hydrochloric Acid
Hydrofluoric Acid
Phosphoric Acid

2. Sulfuric Acids

Spent Sulfuric Acid
Sulfuric Acid (98% or less)

3. Nitric Acid

Nitric Acid (70% or less)

4. Organic Acids

Acetic Acid
Butyric Acid
Formic Acid
Propionic Acid
Acrylic Acid (inhibited)

5. Caustics

Caustic Potash Solution
Caustic Soda Solution
Cresylate Spent Caustic Solution
Sodium Hydrosulfide Solution
(45% or less)

6. Ammonia

Ammonia, Anhydrous
Ammonium Hydroxide (28% or less)
Ammonium Nitrate, Urea, Water
Solutions (containing Ammonia)

7. Aliphatic Amines

Butylamine
Cyclohexylamine
Dibutylamine
Diethylamine
Diethylenetriamine
Diisopropylamine
Dimethylamine
Di-n-propylamine
Ethylamine
Ethylenediamine
Hexamethyleneimine
Methylamine
Morpholine
Propylamine
Tetraethylenepentamine
Triethylamine

8. Alkanolamines

Aminoethylethanolamine
Diethanolamine
Diethylethanolamine
Diisopropanolamine
Dimethylethanolamine
Ethanolamine
Propanolamine
Triethanolamine

9. Aromatic Amines

Aniline
Pyridine
2-Methyl-5-Ethylpyridine

10. Amides

Dimethylformamide

11. Organic Anhydrides

Acetic Anhydride
Phthalic Anhydride
Propionic Anhydride

12. Isocyanates

Diphenylmethane Diisocyanate
Polyphenyl Polymethylene-
isocyanate
Toluene Diisocyanate

13. Vynyl Acetate

Vinyl Acetate (inhibited)

14. Acrylates

Butyl Acrylate (inhibited)
Butyl Methacrylate (inhibited)
Decyl Acrylate (inhibited)
Ethyl Acrylate (inhibited)
2-Ethylhexyl Acrylate (inhibited)
Ethyl Methacrylate (inhibited)
Methyl Acrylate (inhibited)
Methyl Methacrylate (inhibited)

15. Substituted Allyls

Acrylonitrile (inhibited)
Allyl Alcohol
Allyl Chloride
1,3-Dichloropropene

16. Alkylene Oxides

Propylene Oxide
Butylene Oxide

17. Epichlorohydrin

Epichlorohydrin

18. Ketones

Acetone
Camphor Oil
Cyclohexanone
Diisobutyl Ketone
Isophorone
Mesityl Oxide
Methyl Ethyl Ketone
Methyl Isobutyl Ketone

19. Aldehydes

Acetaldehyde
Acrolein (inhibited)
Butyraldehyde
Decaldehyde
Ethylhexaldehyde
Formaldehyde
Glutaraldehyde Solution
Glyoxal Solution
Methylbutyraldehyde
Octyl Aldehyde
Pentyl Aldehyde
Propionaldehyde
Valeraldehyde

20. Alcohols, Glycols

Amyl Alcohol
Butyl Alcohol
1,3-Butylene Glycol
Cyclohexanol
Decyl Alcohol
Diacetone Alcohol
Diisobutyl Carbinol
Dodeconol
Ethanol
Ethoxylated Alcohols

C -C

Ethyl Alcohol
Ethylbutanol
Ethylene Chlorohydrin
Ethylene Cyanohydrin
Ethylene Glycol
2-Ethyl Hexanol
Furfuryl Alcohol
Glycerin
Hexanol
Hexylene Glycol
Methanol
Methyl Alcohol
Methylamyl Alcohol
Methylisobutyl Carbinol
Octyl Alcohol
Nonyl Alcohol
Pentadecanol
Propyl Alcohol
Propylene Glycol
Sorbitol
Tallow Fatty Alcohol
Tetradecanol
Tridecanol
Undecanol

21. Phenols and Cresols

Carbolic Oil
Creosote, Coal Tar
Cresols
Nonyl Phenol
Phenol

22. Caprolactam Solution

Caprolactam Solution

23-29 Unassigned

30. Olefins

Butadiene (inhibited)
Butene

Butylene
Decene
Dicyclopentadiene
Diisobutylene
Dodecene
Ethylene
Hexene
Isoprene (inhibited)
Methyl Acetylene, Propadiene
Mixture (stabilized)
(alpha-) Methyl Styrene
(inhibited)
Nonene
Octene
Pentene
Polybutene
Polypropylene
Propylene
Propylene Butylene Polymer
Propylene Tetramer
Styrene (inhibited)
Vinyl Toluene (inhibited)
Tetradecene
Tridecene
Turpentine
Undecene

31. Paraffins

Butane
Cycloaliphatic Resins
Cyclohexane
Decane
Dodecane
Ethane
Heptane
Hexane
Methane
Nonane
Octane
Pentane
Propane

32. Aromatic Hydrocarbons

Benzene
Benzene, Toluene, Xylene (crude)
Cumene
Cymene
Decylbenzene
Diethylbenzene
Dodecylbenzene
Ethylbenzene
Naphthalene
Tetradecylbenzene
Tetrahydronaphthalene
Toluene
Tridecylbenzene
Triethylbenzene
Undecylbenzene
Xylene

33. Misc. Hydrocarbon Mixtures

Asphalt
Asphalt Blending Stocks
Diphenyl - Diphenyl Oxide
Distillates
Gas Oil, Cracked
Gasoline Blending Stocks
Gasolines
Jet Fuels
Kerosene
Mineral Spirits
Naphtha
Oils, Crude
Oils, Diesel
Oils, Coal
Oils, Fuel (No. 1 thru No. 6)
Oils, Residual
Oils, Road
Oils, Transformer
Petrolatum
Petroleum Naphtha

Amyl Tallate
Butyl Acetate
Butyl Benzyl Phthalate
Castor Oil
Coconut Oil
Cottonseed Oil
Dibutyl Phthalate
Diethylene Glycol Monobutyl
Ether Acetate
Diheptyl Phthalate
Diisodecyl Phthalate
Dinonyl Phthalate
Dioctyl Phthalate
Diundecyl Phthalate
Ethyl Acetate
Ethylene Glycol Monobutyl
Ether Acetate
Ethylene Glycol Monoethyl
Ether Acetate
Ethylhexyl Tallate
Fish Oil
Glycol Diacetate
Lard
Methyl Acetate
Methyl Amyl Acetate
Octyl Epoxy Tallate
Olive Oil
Palm Oil
Peanut Oil
Propyl Acetate
Safflower Oil
Soybean Oil
Tallow
Tucum Oil
Vegetable Oil

35. Vinyl Halides

Vinyl Chloride (inhibited)
Vinylidene Chloride (inhibited)

34. Esters

Amyl Acetate
Chloroform
Dichlorobenzene
1,1-Dichloroethane
Dichloroethyl Ether
Dichloromethane
1,1-Dichloropropane
1,2-Dichloropropane
Ethyl Chloride
Ethylene Dibromide
Ethylene Dichloride
Methyl Chloride
Pentachloroethane
Perchloroethylene
1,1,2,2-Tetrachloroethane
1,2,4-Trichlorobenzene
Trichloroethylene

37. Nitriles

Acetonitrile
Adiponitrile

38. Carbon Disulfide

39. Sulfolane

40. Glycol Ethers

Diethylene Glycol
Diethylene Glycol Monobutyl Ether
Diethylene Glycol Monoethyl Ether
Diethylene Glycol Monomethyl Ether
Dipropylene Glycol
Ethoxy Triglycol
Ethylene Glycol Monobutyl Ether
Ethylene Glycol Monethyl Ether

36. Halogenated Hydrocarbons

Carbon Tetrachloride
Chlorobenzene
Ethylene Glycol Monomethyl Ether
Nonylphenol, Ethoxylated
Polyethylene Glycols
Polypropylene Glycols
Polypropylene Glycol Methyl Ether
Soybean Oil, Epoxidized
Tetraethylene Glycol
Triethylene Glycol

41. Ethers

Butyl Ether
1,4-Dioxane
Ethyl Ether
Methyl Formal (Dimethyl Formal)
Propyl Ether
Tetrahydrofuran

42. Nitrocompounds

(mono-) Nitrobenzene
1- or 2-Nitropropane
Nitrotoluene

43. Miscellaneous Water Solutions

Ammonium Nitrate, Urea, Water Solutions (not containing Ammonia)
Corn Syrup
Dextrose Solution
Latex Solutions
Tetrasodium Salt of EDTA Solution

CHAPTER SIX
Training Manual No.5
FACILITY OPERATIONS MANUAL

prepared by

Universal Waste & Transit

Orient Road

Tampa Florida

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Introduction

This manual is designed to familiarize you with basic practices at the Universal Waste & Transit storage and treatment facility. Much of your training in this area will be on-the-job.

Do not be afraid to ask questions!! This is your training period. We want you to be as safe and comfortable with your duties as possible. We will assist you as much as we can.

Remember - if you have a question or concern about performing a task always ask before acting!!

Incoming Material

All incoming material is to be placed into the "incoming staging area" immediately. Do not take these containers anywhere else until notified to do so by your supervisor.

Facility personnel will inspect these containers to insure their contents are correct and obtain QC samples.

All off-loading should be performed manually if possible. A "drum truck" should be used. If however a drum is too heavy a tow motor equipped with a drum handling attachment will be employed. Never move a drum or container using the forks on a tow motor. There is always a potential for puncturing the drum.

Manifests

For all waste movement, either bulk or drum lots, a manifest for the movement of such waste must be prepared either by the generator or by Universal Waste & Transit. The following procedure is to be used:

1. Manifest is to be prepared before shipment to the extent possible.
2. Manifest is to include:
 - a. DOT shipping name
 - b. Hazard Class Description
 - c. All required ID Numbers
3. Manifest must be signed by generator and transporter.
4. A copy of the signed manifest must be given to the generator at the time of shipment.
5. The manifest is to be signed by a representative of that designated treatment/storage/disposal facility (TSDF).
6. The transporter is to retain one (1) copy of the manifest and leave all other copies at the treatment/storage/disposal facility.
7. The treatment/storage/disposal facility will return the manifest to the generator.
8. For pickup of drum lots for transfer to the Universal Waste & Transit storage facility, the manifest must include all required certification statements.
9. Other requirements as dictated by specific disposal sites such as work order number and code number must be addressed as necessary.

A typical manifest and certification statements are attached.

EXHIBIT 1
UNIVERSAL WASTE & TRANSIT, INC.

UNIFORM HAZARDOUS WASTE MANIFEST		1. Generator's US EPA ID No.		Manifest Document No.		2. Page 1 of		Information in the shaded areas is not required by Federal law.					
3. Generator's Name and Mailing Address						A. State Manifest Document Number							
						B. State Generator's ID							
4. Generator's Phone ()		6. US EPA ID Number				C. State Transporter's ID							
5. Transporter 1 Company Name						D. Transporter's Phone							
7. Transporter 2 Company Name		8. US EPA ID Number				E. State Transporter's ID							
						F. Transporter's Phone							
9. Designated Facility Name and Site Address		10. US EPA ID Number				G. State Facility's ID							
						H. Facility's Phone							
11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)						12. Containers		13. Total Quantity		14. Unit Wt/Vol		15. Waste No.	
a. <small>HM</small>						No. Type							
b.													
c.													
d.													
J. Additional Descriptions for Materials Listed Above						K. Handling Codes for Wastes Listed Above							
15. Special Handling Instructions and Additional Information													
16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national governmental regulations.													
Printed/Typed Name						Signature		Date					
								Month Day Year					
17. Transporter 1 Acknowledgement of Receipt of Materials								Date					
Printed/Typed Name						Signature		Month Day Year					
18. Transporter 2 Acknowledgement of Receipt of Materials								Date					
Printed/Typed Name						Signature		Month Day Year					
19. Discrepancy Indication Space													
20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.													
Printed/Typed Name						Signature		Date					
								Month Day Year					

ORIGINAL - RETURN TO GENERATOR

Labeling

Before shipment of any drum lot wastes, all EPA and DOT required labels must be applied. This includes DOT shipping name, hazard label and a completed hazardous waste label.

All required EPA and DOT labels must be applied to the top one-third (1/3) of the container. The DOT shipping name and number should appear legibly on the top of the container.

Placarding

The truck used to transport hazardous materials must be placarded. In general, the placard used on the truck will coincide with the hazard label on the drums being transported.

<u>Material</u>	<u>Placard</u>
Flammable Liquid	Flammable
Flammable Solid	Flammable
Corrosive Liquid	Corrosive
Poison B	Poison
Mixed Loads	Dangerous
ORM-E	None Required

If you are unsure as to the placard required, contact the office first.

Storage

RCRA requires that reactive materials be stored in such a manner as to minimize the possibility of dangerous reactions occurring in case of a leak or other accident. The storage area has taken this requirement into account during the design phases.

All flammable and combustible wastes are stored in a separate, specifically designed area. No other area is acceptable for the storage of these wastes.

All other wastes are stored for transport to their ultimate disposal location. The routing supervisor or facility manager will inform you as to these specific locations.

All waste transportation vehicles should be parked in the loading/unloading areas during non-working hours.

Empty Drum Handling

All labels on empty drums are either to be removed or painted over such that the name of the generator of the waste; the DOT hazard label and markings; as well as the hazardous waste label are no longer discernible. Any labels which indicate that the drum once contained a hazardous waste must also be removed except if the waste is one listed in paragraph "e" Part 261.33 ("P" Wastes).

All empty drums will either be crushed for reclamation or burial or they may be cleaned and reused dependent upon the previous contents.

An empty drum is one which contains less than one inch of residue; or no more than 3% by weight of the total capacity of a container having a volume of 110 gallons or less (0.3% for larger containers).

Compressed gas cylinders must be at atmospheric pressure to be considered empty. Containers holding acutely hazardous waste must have been tripled rinsed with a suitable solvent to be considered empty.

Basic Safety Policies

1. Absolutely no smoking in the facility.
2. All employees/visitors are required to wear eye protection.
3. All flammable/combustible drums must be stored in the flammable area.
4. Acid resistant clothing must be worn when handling corrosive materials.
5. Safety shoes are required for any employees moving drums.
6. Gloves must be worn at all times when handling waste containers (open or closed).
7. Spark proof tools must be used on flammable waste containers.
8. All drums must remain properly sealed unless being sampled, consolidated or treated.
9. Forks on tow motor must be completely lowered when not in use. Only use drum handler to move drums.
10. No food or drinks permitted in facility.
11. All employees must change from the work uniform before leaving for the day.
12. All designated aisles and exits must be kept clear at all times.
13. Wear hardhats and/or safety glasses in customer's plants as required. Nearly all plants require eye protection.
14. The main gate is to be closed at all times except for ingress & egress of vehicles. The overhead doors can remain open during normal working hours.
15. No unescorted visitors permitted in the facility.

Driver Information

For Spills Onto Roadways

Contain spill with sorbent materials.

Notify Universal Waste & Transit Emergency Response Coordinator (ERC).

Pamela Day @ 963-0177

or

Sharon Roehm @ 864-2166

All spills involving transportation must be reported to the National Response Center. Universal Waste & Transit, ERC will notify the National Response Center. If ERC can not be contacted call NRC at

1-800-424-8802

Notify local authorities.

For information on cleanup procedures, call ChemTrec

1-800-424-9300

If spill results in any of the following, the Department of Transportation must be notified at :1-202-426-1830

1. A person is killed
2. A person is hospitalized
3. Property damage exceeds \$50,000.00
4. Continuing danger exists for a facility or personnel

All spills of hazardous waste must be reported using the attached DOT incident report form. (Exhibit 2)

Your drivers guide lists the reportable quantities (RQ) that must be reported to the National Response Center from the total number of containers involved.

Transportation Routes

Follow only city/county truck routes during all transport whenever possible. Only leave these roads for material pickup. Use the most direct route to the generator when leaving a truck route.

When leaving the facility follow only this truck route if possible:

Orient Road to I-4 or

Orient Road to Crosstown Expressway

Attempts should be made to limit truck access and egress to the facility to normal working hours (7:00 a.m. to 6:00 p.m.).

EXHIBIT 2

FOR HAZARDOUS WASTES
RELEASE OR SPILLS

DEPARTMENT OF TRANSPORTATION

Form Approved OMB No. 04-5613

HAZARDOUS MATERIALS INCIDENT REPORT

INSTRUCTIONS: Submit this report in duplicate to the Secretary, Hazardous Materials Regulations Board, Department of Transportation, Washington, D.C. 20590, (ATTN: Op. Div.). If space provided for any item is inadequate, complete that item under Section H, "Remarks", keying to the entry number being completed. Copies of this form, in limited quantities, may be obtained from the Secretary, Hazardous Materials Regulations Board. Additional copies in this prescribed format may be reproduced and used, if on the same size and kind of paper.

A INCIDENT			
1. TYPE OF OPERATION 1 <input type="checkbox"/> AIR 2 <input type="checkbox"/> HIGHWAY 3 <input type="checkbox"/> RAIL 4 <input type="checkbox"/> WATER 5 <input type="checkbox"/> FREIGHT FORWARDER 6 <input type="checkbox"/> WASTE			
2. DATE AND TIME OF INCIDENT (Month - Day - Year) _____ a.m. _____ p.m.		3. LOCATION OF INCIDENT	
B REPORTING CARRIER, COMPANY OR INDIVIDUAL			
4. FULL NAME		5. ADDRESS (Number, Street, City, State and Zip Code)	
EPA IDENTIFICATION CODE NO.			
6. TYPE OF VEHICLE OR FACILITY			
C SHIPMENT INFORMATION			
7. NAME AND ADDRESS OF SHIPPER (Origin address)		8. NAME AND ADDRESS OF CONSIGNEE (Destination address)	
9. SHIPPING PAPER IDENTIFICATION NO.		10. SHIPPING PAPERS ISSUED BY <input type="checkbox"/> CARRIER <input type="checkbox"/> SHIPPER <input type="checkbox"/> OTHER (Identify) _____	
D DEATHS, INJURIES, LOSS AND DAMAGE			
DUE TO HAZARDOUS MATERIALS INVOLVED			13. ESTIMATED AMOUNT OF LOSS AND/OR PROPERTY DAMAGE INCLUDING COST OF DECONTAMINATION (Round off in dollars) \$
11. NUMBER PERSONS INJURED	12. NUMBER PERSONS KILLED		
14. ESTIMATED TOTAL QUANTITY OF HAZARDOUS MATERIALS RELEASED			
E HAZARDOUS MATERIALS INVOLVED			
15. CLASSIFICATION (Sec. 172.4)	16. SHIPPING NAME (Sec. 172.5)		17. TRADE NAME
F NATURE OF PACKAGING FAILURE			
18. (Check all applicable boxes)			
(1) DROPPED IN HANDLING	(2) EXTERNAL PUNCTURE	(3) DAMAGE BY OTHER FREIGHT	
(4) WATER DAMAGE	(5) DAMAGE FROM OTHER LIQUID	(6) FREEZING	
(7) EXTERNAL HEAT	(8) INTERNAL PRESSURE	(9) CORROSION OR RUST	
(10) DEFECTIVE FITTINGS, VALVES, OR CLOSURES	(11) LOOSE FITTINGS, VALVES OR CLOSURES	(12) FAILURE OF INNER RECEPTACLES	
(13) BOTTOM FAILURE	(14) BODY OR SIDE FAILURE	(15) WELD FAILURE	
(16) CHIME FAILURE	(17) OTHER CONDITIONS (Identify)	19. SPACE FOR DOT USE ONLY	

UNIVERSAL WASTE & TRANSIT, INC.
CUSTOMER NOTIFICATION AND CERTIFICATION

ONLY STATEMENTS WITH ORIGINAL SIGNATURES WILL BE ACCEPTED!!

Generator Name/Location: _____

EPA ID Number: _____ Manifest Number: _____ Profile Number: _____

This waste is a ☐ Wastewater ☐ Nonwastewater. Is analytical available? Yes ☐ No ☐ (If yes, please attach copy.)

EPA Waste Code Number(s): _____

PART I

WASTE CATEGORY [Check appropriate line(s)]

☐ **Unrestricted Waste Notification**

The disposal of this waste is not restricted as specified in 40 CFR 268, Subpart D and all prohibitions set forth in 40 CFR 268.32 or RCRA Section 3004(d).

☐ **Restricted Waste Notification**

☐ This is a restricted waste which meets the treatment standards as specified in 40 CFR 268, Subpart D.

☐ This waste does not meet the treatment standards specified in 40 CFR 268, Subpart D. Waste must be treated to the appropriate standard and/or in such a manner which renders it non-liquid by chemical fixation or solidification prior to land disposal. [See treatment standard below or see attached Part II section(s).]

Corresponding Treatment Standard _____

☐ **Restricted Waste Variance Notification**

This waste is not prohibited from land disposal at this time due to a case-by-case extension, an exemption, or a nationwide capacity variance. This waste may be subject to landfill restriction after the date below.

Applicable Variance/Date _____

☐ **Treated Waste Certification**

☐ I believe that the treatment process used to treat this waste has been operated and maintained properly so as to comply with the performance levels specified in 40 CFR 268, Subpart D, and all applicable prohibitions set forth in 40 CFR 268.32 or RCRA Section 3004(d) without impermissible dilution of the prohibited waste.

☐ I believe that the nonwastewater organic constituents have been treated by incineration in units operated in accordance with the applicable technical requirements, and I have been unable to detect the nonwastewater organic constituents despite having used best good faith efforts to analyze for such constituents.

☐ **Lab Pack Certification**

☐ **Organometallic (inorganic)**

This lab pack contains only the wastes specified in Appendix IV to 40 CFR 268 or solid waste not subject to regulation under 40 CFR 261. (See attached appendix I for acceptable material)

☐ **Organic**

This lab pack contains only organic wastes specified in Appendix V to 40 CFR 268 or solid waste not subject to regulation under 40 CFR 261. (See attached appendix I for acceptable material)

I certify that I personally have examined and am familiar with the waste, treatment technology, and/or operation of the treatment process through analysis and testing or through personal knowledge sufficient to support the above checked certification. I believe that the information I submitted is true, accurate, and complete. I am also aware that there are significant penalties for submitting a false certification, including the possibility of a fine and imprisonment.

SIGNATURE: _____ DATE: _____

PRINTED NAME: _____ TITLE: _____

PART II
(Check the appropriate box(es))

EPA CODES	SUBCATEGORY or WASTE DESCRIPTION	CONSTITUENT CONCERN	NONWASTEWATER		WASTEWATER
			Total Composition (mg/kg)	TCLP (mg/L)	Total Composition (mg/L)
A. TREATMENT STANDARDS FOR CHARACTERISTIC WASTES					
[] D001	Ignitable liquids, high-TOC non-wastewater subcategory		R006; FSUBS; or INCIN	-	-
[] D001	Ignitable liquids, low-TOC non-wastewater subcategory (1X(100)101)		DEACT	-	-
[] D001	Ignitable liquids, wastewater subcategory (<1X(100) & <1X(100)101)		-	-	DEACT
[] D001	Ignitable compressed gas		DEACT	-	-
[] D001	Ignitable reactives		DEACT	-	-
[] D001	Oxidizers		DEACT	-	DEACT
[] D002	Acid subcategory	pH <2.0	DEACT	-	DEACT
[] D002	Alkaline subcategory	pH >12.5	DEACT	-	DEACT
[] D002	Other subcategory		DEACT	-	DEACT
[] D003	Reactive subcategories	Total Cyanides	500	-	Reserved
		Avenable Cyanides	50	-	0.66
[] D003	Water reactive subcategory		DEACT	-	-
[] D003	Reactive sulfides subcategory		DEACT	-	DEACT
[] D003	Other reactives subcategory		DEACT	-	DEACT
[] D004	Arsenic	Arsenic	-	5.0	5.0
[] D005	Barium	Barium	-	100	100
[] D006	Cadmium	Cadmium	-	1.0	1.0
[] D006	Cadmium batteries subcategory		RTHRM	-	-
[] D007	Chromium	Chromium	-	5.0	5.0
[] D008	Lead	Lead	-	5.0	5.0
[] D008	Lead acid batteries		RLEAD	-	-
[] D009	Low-mercury subcategory (<260 mg/kg total mercury)	Mercury	-	0.2	0.2
[] D009	High-mercury subcategory (>260 mg/kg total mercury)	Mercury	RHEMC or IMERC	-	-
[] D010	Selenium	Selenium	-	5.7	1.0
[] D011	Silver	Silver	-	5.0	5.0
[] D012	Endrin	Endrin	0.13	-	B10DG or INCIN
[] D013	Lindane	Lindane	0.066	-	CARBN or INCIN
[] D014	Methoxychlor	Methoxychlor	0.15	-	WETOX or INCIN
[] D015	Toxaphene	Toxaphene	1.3	-	B10DG or INCIN
[] D016	2,4-D	2,4-Dichlorophenoxyacetic acid	10.0	-	CHOXD, B10DG, or INCIN
[] D017	2,4,5-TP (Silvex)	2,4,5-TP (Silvex)	7.9	-	CHOXD or INCIN
[] D018	Benzene	Benzene		0.5	
[] D019	Carbon tetrachloride	Carbon tetrachloride		0.5	
[] D020	Chlordane	Chlordane		0.03	
[] D021	Chlorobenzene	Chlorobenzene		100	
[] D022	Chloroform	Chloroform		6.0	
[] D023	o-Cresol	o-Cresol		200	
[] D024	m-Cresol	m-Cresol		200	
[] D025	p-Cresol	p-Cresol		200	
[] D026	Cresol	Cresol		200	
[] D027	1,4-Dichlorobenzene	1,4-Dichlorobenzene		7.5	
[] D028	1,2-Dichlorobenzene	1,2-Dichlorobenzene		0.5	
[] D029	1,1-Dichloroethylene	1,1-Dichloroethylene		0.7	
[] D030	2,4-Dinitrotoluene	2,4-Dinitrotoluene		0.13	

PART II (Continued)
(Check the appropriate box(es))

EPA CODES	SUBCATEGORY or WASTE DESCRIPTION	CONSTITUENT CONCERN	NONWASTEWATER		WASTEWATER
			Total Composition (mg/kg)	TCLP (mg/L)	Total Composition (mg/L)
A. TREATMENT STANDARDS FOR CHARACTERISTIC WASTES (Continued)					
[] D031	Heptachlor (as its hydroxide)	Heptachlor	-	0.008	-
[] D032	Hexachlorobenzene	Hexachlorobenzene	-	0.13	-
[] D033	Hexachlorobutadiene	Hexachlorobutadiene	-	0.5	-
[] D034	Hexachloroethane	Hexachloroethane	-	3.0	-
[] D035	Methyl ethyl ketone	Methyl ethyl ketone	-	200	-
[] D036	Nitrobenzene	Nitrobenzene	-	2.0	-
[] D037	Pentachlorophenol	Pentachlorophenol	-	100	-
[] D038	Pyridine	Pyridine	-	5.0	-
[] D039	Tetrachloroethylene	Tetrachloroethylene	-	0.7	-
[] D040	Trichloroethylene	Trichloroethylene	-	0.5	-
[] D041	2,4,5-TP (2,4,5-Trichlorophenol)	2,4,5-Trichlorophenol	-	400	-
[] D042	2,4,6-Trichlorophenol	2,4,6-Trichlorophenol	-	2.0	-
[] D043	Vinyl chloride	Vinyl chloride	-	0.2	-
B. TREATMENT STANDARDS FOR "F" LISTED WASTES					
[] F001- F005 Spent solvent wastes					
[]	Acetone	Acetone	-	0.59	0.05
[]	Benzene	Benzene	3.7	-	0.070
[]	n-Butyl alcohol	n-Butyl alcohol	-	5.0	5.0
[]	Carbon disulfide	Carbon disulfide	-	4.81	1.05
[]	Carbon tetrachloride	Carbon tetrachloride	-	0.96	0.05
[]	Chlorobenzene	Chlorobenzene	-	0.05	0.15
[]	Cresols (& Cresylic acid)	Cresols (& Cresylic acid)	-	0.75	2.82
[]	Cyclohexanone	Cyclohexanone	-	0.75	0.125
[]	1,2-Dichlorobenzene	1,2-Dichlorobenzene	-	0.125	0.65
[]	2-Ethoxyethanol	2-Ethoxyethanol	INCIN	-	B10DG or INCIN
[]	Ethyl acetate	Ethyl acetate	-	0.75	0.05
[]	Ethyl benzene	Ethyl benzene	-	0.053	0.05
[]	Ethyl ether	Ethyl ether	-	0.75	0.05
[]	Isobutanol	Isobutanol	-	5.0	5.0
[]	Methanol	Methanol	-	0.75	0.25
[]	Methylene chloride	Methylene chloride	-	0.96	0.20
[]	Methylene chloride (from the pharmaceutical industry)	Methylene chloride (from the pharmaceutical industry)	-	-	0.44
[]	Methyl ethyl ketone	Methyl ethyl ketone	-	0.75	0.05
[]	Methyl isobutyl ketone	Methyl isobutyl ketone	-	0.33	0.05
[]	Nitrobenzene	Nitrobenzene	-	0.125	0.66
[]	2-Nitropropane	2-Nitropropane	INCIN	-	(WETOX or CHOXD) fb CARBN; or INCIN
[]	Pyridine	Pyridine	-	0.33	1.12
[]	Tetrachloroethylene	Tetrachloroethylene	-	0.05	0.079
[]	Toluene	Toluene	-	0.33	1.12
[]	1,1,1-Trichloroethane	1,1,1-Trichloroethane	-	0.41	1.05
[]	1,2,2-Trichloroethane	1,2,2-Trichloroethane	7.6	-	0.030
[]	1,2,2-Trichloro-1,2,2-trifluoroethane	1,2,2-Trichloro-1,2,2-trifluoroethane	-	0.96	1.05
[]	Trichloroethylene	Trichloroethylene	-	0.091	0.062
[]	Trichlorofluoroethane	Trichlorofluoroethane	-	0.60	0.05
[]	Xylene	Xylene	-	0.15	0.05

PART II (Continued)
[Check the appropriate box(es)]

EPA CODES	SUBCATEGORY or WASTE DESCRIPTION	CONSTITUENT CONCERN	NONWASTEWATER		WASTEWATER
			Total Composition (mg/kg)	TCLP (mg/L)	Total Composition (mg/L)
B. TREATMENT STANDARDS FOR "F" LISTED WASTES (Continued)					
[] F006	Wastewater treatment sludges from electroplating operations	Cadmium	-	0.066	1.6
		Chromium	-	5.2	0.32
		Lead	-	0.51	0.040
		Nickel	-	0.32	0.44
		Silver	-	0.072	-
		Cyanides (Total)	590	-	1.2
		Cyanides (Amenable)	30	-	0.96
[] F007	Spent cyanide plating bath solutions from electroplating operations	Cadmium	-	0.066	-
		Chromium	-	5.2	0.32
		Lead	-	0.51	0.04
		Nickel	-	0.32	0.44
		Silver	-	0.072	-
		Cyanides (Total)	590	-	1.9
		Cyanides (Amenable)	30	-	0.10
[] F008	Plating bath sludges from the bottom of plating baths from electroplating operations where cyanides are used in the process	Cadmium	-	0.066	-
		Chromium	-	5.2	0.32
		Lead	-	0.51	0.04
		Nickel	-	0.32	0.44
		Silver	-	0.072	-
		Cyanides (Total)	590	-	1.9
		Cyanides (Amenable)	30	-	0.10
[] F009	Spent stripping and cleaning bath solutions from electroplating operations where cyanides are used in the process	Cadmium	-	0.066	-
		Chromium	-	5.2	0.32
		Lead	-	0.51	0.04
		Nickel	-	0.32	0.44
		Silver	-	0.072	-
		Cyanides (Total)	590	-	1.9
		Cyanides (Amenable)	30	-	0.10
[] F010	Quenching bath sludge from oil baths in metal heat treating operations where cyanides are used in the process	Cyanides (Total)	1.5	-	1.9
		Cyanides (Amenable)	-	-	0.10
[] F011	Spent cyanide solutions from salt bath pot cleaning from metal heat treating operations	Cadmium	-	0.066	-
		Chromium	-	5.2	0.32
		Lead	-	0.51	0.04
		Nickel	-	0.32	0.44
		Silver	-	0.072	-
		Cyanides (Total)	110	-	1.9
		Cyanides (Amenable)	9.1	-	0.10

PART II (Continued)
[Check the appropriate box(es)]

EPA CODES	SUBCATEGORY or WASTE DESCRIPTION	CONSTITUENT CONCERN	NONWASTEWATER		WASTEWATER
			Total Composition (mg/kg)	TCLP (mg/L)	Total Composition (mg/L)
E. TREATMENT STANDARDS FOR "F" LISTED WASTES (Continued)					
[] F012	Quenching wastewater treatment sludges from metal heat treating operations where cyanides are used in the process	Cadmium	-	0.066	-
		Chromium	-	5.2	0.32
		Lead	-	0.51	0.04
		Nickel	-	0.32	0.44
		Silver	-	0.072	-
		Cyanides (Total)	110	-	1.9
		Cyanides (Amenable)	9.1	-	0.10
[] F019	Wastewater treatment sludges from the chemical conversion coating of aluminum	Chromium	-	5.2	0.32
		Cyanides (Total)	110	-	1.2
		Cyanides (Amenable)	9.1	-	0.86
E. TREATMENT STANDARDS FOR CALIFORNIA LISTED WASTES					
[]	Nickel (Liquid waste)	Nickel	154	-	-
[]	Thallium (Liquid waste)	Thallium	130	-	-
[]	Cyanide (Liquid waste)	Cyanide	1000	-	-
[]	Halogenated organic compounds (for list of HOC's, see appendix II)	HOCs	<1000	-	-
[]	PCBs (Liquid waste)	PCBs	<50	-	-

UNIVERSAL WASTE & TRANSIT, INC.

Volume 4, Tab H

06/28/90

Revision 1

APPENDIX I LAB PACK MATERIALS

Two subcategories of lab pack wastes have been established, organic and organometallic. Lab packs that are 100% organic compounds are "organic" and all others are "organometallic".

Organic -

Organic lab packs may consist of any and/or all of the following characteristic and listed wastes.

D001, D012, D013, D014, D015, D016, D017

F001, F002, F003, F004, F005, F006, F007, F008, F009, F010, F011, F012, F013, F014, F015, F016, F017, F018, F019, F020, F021, F022, F023, F024, F025, F026, F027, F028

K001, K009, K010, K011, K013, K014, K015, K016, K017, K018, K019, K020, K021, K022, K023, K024, K025, K026, K027, K028, K029, K030, K031, K032, K033, K034, K035, K036, K037, K038, K039, K040, K041, K042, K043, K044, K045, K046, K047, K048, K049, K050, K051, K052, K054, K060, K065, K073, K083, K084, K085, K086, K087, K092, K094, K095, K096, K097, K098, K099, K101, K102, K103, K104, K105, K111, K112, K113, K114, K115, K116, K117, K118, K123, K124, K125, K126, K135

P001, P002, P003, P004, P005, P006, P007, P008, P009, P013, P014, P015, P016, P017, P018, P020, P022, P023, P024, P025, P026, P027, P028, P031, P034, P036, P037, P038, P039, P040, P041, P042, P043, P044, P045, P046, P047, P048, P049, P050, P051, P054, P055, P057, P058, P059, P060, P062, P063, P064, P065, P066, P067, P068, P069, P070, P071, P072, P073, P074, P075, P077, P081, P082, P084, P085, P087, P088, P089, P092, P093, P094, P095, P096, P097, P098, P099, P101, P102, P103, P104, P105, P106, P109, P110, P111, P112, P113, P114, P115, P116, P118, P119, P120, P122, P123

U001, U002, U003, U004, U005, U006, U007, U008, U009, U010, U011, U012, U014, U015, U016, U017, U018, U019, U020, U021, U022, U023, U024, U025, U026, U027, U028, U029, U030, U031, U032, U033, U034, U035, U036, U037, U038, U039, U041, U042, U043, U044, U045, U046, U047, U048, U049, U050, U051, U052, U053, U055, U056, U057, U058, U059, U060, U061, U062, U063, U064, U065, U067, U068, U069, U070, U071, U072, U073, U074, U075, U076, U077, U078, U079, U080, U081, U082, U083, U084, U085, U086, U087, U088, U089, U090, U091, U092, U093, U094, U095, U096, U097, U098, U099, U101, U102, U103, U105, U106, U107, U108, U109, U110, U111, U112, U113, U114, U115, U116, U117, U118, U119, U120, U121, U122, U123, U124, U125, U126, U127, U128, U129, U130, U131, U132, U133, U135, U137, U138, U139, U140, U141, U142, U143, U147, U148, U149, U150, U153, U154, U155, U156, U157, U158, U159, U160, U161, U162, U163, U164, U165, U166, U167, U168, U169, U170, U171, U172, U173, U174, U175, U177, U178, U179, U180, U181, U182, U183, U184, U185, U186, U187, U188, U189, U190, U191, U192, U193, U194, U195, U197, U200, U201, U202, U203, U205, U206, U207, U208, U209, U210, U211, U212, U214, U218, U219, U220, U221, U222, U223, U225, U226, U227, U228, U234, U235, U236, U237, U238, U239, U240, U243, U244, U245, U247, U248, U249, U238, U239, U239

Organometallic (inorganic) -

Organometallic lab packs may consist of any and/or all the the following characteristic and listed waste materials.

D001, D002, D003, D004, D005, D006, D007, D008, D010, D011, D012, D013, D014, D015, D016, D017

F001, F002, F003, F004, F005, F006, F010, F020, F021, F023, F024, F026, F027, F028

K001, K002, K008, K009, K010, K011, K013, K014, K015, K016, K017, K018, K019, K020, K021, K022, K023, K024, K025, K026, K027, K028, K029, K030, K031, K032, K033, K034, K035, K036, K037, K038, K039, K040, K041, K042, K043, K044, K045, K046, K047, K048, K049, K050, K051, K052, K054, K060, K061, K064, K065, K066, K069, K071, K073, K083, K084, K085, K086, K087, K092, K094, K095, K096, K097, K098, K099, K101, K102, K103, K104, K105, K111, K112, K113, K114, K115, K116, K117, K118, K123, K124, K125, K126, K135

P001, P002, P003, P004, P005, P006, P007, P008, P009, P013, P014, P015, P016, P017, P018, P020, P022, P023, P024, P025, P026, P027, P028, P031, P034, P036, P037, P038, P039, P040, P041, P042, P043, P044, P045, P047, P048, P049, P050, P051, P054, P055, P057, P058, P059, P060, P062, P063, P064, P065, P066, P067, P068, P069, P070, P071, P072, P073, P074, P075, P077, P081, P082, P084, P085, P087, P088, P089, P092, P093, P094, P095, P096, P097, P098, P099, P101, P102, P103, P104, P105, P108, P109, P110, P112, P113, P114, P115, P116, P118, P119, P120, P122, P123

U001, U002, U003, U004, U005, U006, U007, U008, U009, U010, U011, U012, U014, U015, U016, U017, U018, U019, U020, U021, U022, U023, U024, U025, U026, U027, U028, U029, U030, U031, U032, U033, U034, U035, U036, U037, U038, U039, U041, U042, U043, U044, U045, U046, U047, U048, U049, U050, U051, U052, U053, U055, U056, U057, U058, U059, U060, U061, U062, U063, U064, U065, U067, U068, U069, U070, U071, U072, U073, U074, U075, U076, U077, U078, U079, U080, U081, U082, U083, U084, U085, U086, U087, U088, U089, U090, U091, U092, U093, U094, U095, U096, U097, U098, U099, U101, U102, U103, U105, U106, U107, U108, U109, U110, U111, U112, U113, U114, U115, U116, U117, U118, U119, U120, U121, U122, U123, U124, U125, U126, U127, U128, U129, U130, U131, U132, U133, U134, U135, U136, U137, U138, U139, U140, U141, U142, U143, U144, U145, U146, U147, U148, U149, U150, U153, U154, U155, U156, U157, U158, U159, U160, U161, U162, U163, U164, U165, U166, U167, U168, U169, U170, U171, U172, U173, U174, U175, U177, U178, U179, U180, U181, U182, U183, U184, U185, U186, U187, U188, U189, U190, U191, U192, U193, U194, U195, U197, U200, U201, U202, U203, U205, U206, U207, U208, U209, U210, U211, U212, U214, U218, U219, U220, U221, U222, U223, U225, U226, U227, U228, U234, U235, U236, U237, U238, U239, U240, U243, U244, U245, U247, U248, U249, U238, U239, U239

APPENDIX II HALOGENATED ORGANIC COMPOUNDS FOR CALIFORNIA LISTING

Aldrin	1,2-Dibromo-3-chloropropane	Kepone
Aroclor 1016	Dibromomethane	Methoxychlor
Aroclor 1221	1,2-Dibromoethane	Methylene chloride
Aroclor 1232	trans-1,4-Dichloro-2-butene	4,4'-Methylenebis(2-chloroaniline)
Aroclor 1242	m-Dichlorobenzene	PCB's not otherwise specified
Aroclor 1248	o-Dichlorobenzene	Pentachlorobenzene
Aroclor 1254	p-Dichlorobenzene	Pentachlorobenzo-p-dioxins
Aroclor 1260	3,3'-Dichlorobenzidine	Pentachlorodibenzofurans
alpha-BHC	Dichlorodifluoroethane	Pentachloroethane
beta-BHC	1,1-Dichloroethane	Pentachloronitrobenzene
delta-BHC	1,2-Dichloroethane	Pentachlorophenol
gamma-BHC	trans-1,2-Dichloroethene	Pronamide
Bis(2-chloroethoxy)methane	1,1-Dichloroethylene	Silvex (2,4,5-TP)
Bis(2-chloroethyl)ether	2,4-Dichlorophenol	2,4,5-T
Bis(2-chloroisopropyl)ether	2,6-Dichlorophenol	1,2,4,5-Tetrachlorobenzene
Bromochloromethane	2,4-Dichlorophenoxyacetic acid	2,3,7,8-Tetrachlorodibenzop-d-dioxin
Bromomethane	1,2-Dichloropropane	Tetrachlorodibenzo-p-dioxins
Carbox. tetrachloride	cis-1,3-Dichloropropene	Tetrachlorodibenzofurans
Chloroacene	trans-1,3-Dichloropropene	1,1,1,2-Tetrachloroethane
1-Chloro-1,3-butadiene	Stelcryn	1,1,2,2-Tetrachloroethane
p-Chloro-m-cresol	Endosulfan I	Tetrachloroethene
p-Chloroaniline	Endosulfan II	2,3,4,6-Tetrachlorophenol
Chlorobenzene	Endrin	Toxaphene
Chloropentilate	Endrin aldehyde	Tribromomethane
Chlorosulfonmethane	Heptachlor	1,2,4-Trichlorobenzene
Chloroethane	Heptachlor epoxide	1,1,1-Trichloroethane
2-Chloroethyl vinyl ether	Hexachlorobenzene	1,1,2-Trichloroethane
Chloroform	Hexachlorobutadiene	Trichloroethene
Chloroethane	Hexachlorocyclopentadiene	Trichloroethoxyfluoromethane
2-Chloronaphthalene	Hexachlorodibenzo-p-dioxins	2,4,5-Trichlorophenol
2-Chlorophenol	Hexachlorodibenzofuran	2,4,6-Trichlorophenol
3-Chloropropene	Hexachloroethane	1,2,3-Trichloropropane
3-Chloropropionitrile	Hexachloropropene	Tris(2,3-dibromoisopropyl)phosphate
DDT	Hexachlorophenone	Vinyl chloride
DDE	Iodoethane	
DDT	Isodrin	

APPENDIX III
EFFECTIVE DATES

Waste Code	Waste Category	Effective Date	Waste Code	Waste Category	Effective Date
California list	Soil and debris	Nov. 8, 1990	K043	Soil and debris	June 8, 1991
	HOCs from CERCLA/PCRA corrective.		K048	Nonwastewater	Nov. 8, 1990
			K049	Nonwastewater	Nov. 8, 1990
			K050	Nonwastewater	Nov. 8, 1990
			K051	Nonwastewater	Nov. 8, 1990
D004	Inorganic solid debris.	May 8, 1992	K052	Nonwastewater	Nov. 8, 1990
D004	Nonwastewater	May 8, 1992	K084	Nonwastewater	May 8, 1992
D005	Inorganic solid debris.	May 8, 1992	K093	Soil and debris	June 8, 1991
			K094	Soil and debris	June 8, 1991
D006	Inorganic solid debris.	May 8, 1992	K095	Soil and debris	June 8, 1991
			K096	Soil and debris	June 8, 1991
D007	Inorganic solid debris.	May 8, 1992	K101	Nonwastewater	May 8, 1992
			K102	Nonwastewater	May 8, 1992
D008	Inorganic solid debris.	May 8, 1992	K106	High mercury non-wastewater.	May 8, 1992
D008	Lead acid batteries.	May 8, 1992	K105	Low mercury non-wastewater.	May 8, 1992
D009	Inorganic solid debris.	May 8, 1992	K113	Soil and debris	June 8, 1991
D009	High mercury non-wastewater.	May 8, 1992	K114	Soil and debris	June 8, 1991
			K115	Soil and debris	June 8, 1991
D009	Low mercury non-wastewater.	May 8, 1992	K116	Soil and debris	June 8, 1991
			P010	Nonwastewater	May 8, 1992
			P011	Nonwastewater	May 8, 1992
D010	Inorganic solid debris.	May 8, 1992	P012	Nonwastewater	May 8, 1992
			P036	Nonwastewater	May 8, 1992
D011	Inorganic solid debris.	May 8, 1992	P038	Nonwastewater	May 8, 1992
			P039	Soil and debris	June 8, 1991
F001-F005	Soil and debris	Nov. 8, 1990	P040	Soil and debris	June 8, 1991
F010	Soil and debris	June 8, 1991	P041	Soil and debris	June 8, 1991
F020	Soil and debris	Nov. 8, 1990	P043	Soil and debris	June 8, 1991
F021	Soil and debris	Nov. 8, 1990	P044	Soil and debris	June 8, 1991
F022	Soil and debris	Nov. 8, 1990	P062	Soil and debris	June 8, 1991
F023	Soil and debris	Nov. 8, 1990	P065	High mercury non-wastewater.	May 8, 1992
F024	Soil and debris	June 8, 1991			
F026	Soil and debris	Nov. 8, 1990	P065	Low mercury non-wastewater.	May 8, 1992
F027	Soil and debris	Nov. 8, 1990			
F028	Soil and debris	Nov. 8, 1990	P071	Soil and debris	June 8, 1991
F039	Nonwastewater	May 8, 1992	P085	Soil and debris	June 8, 1991
K009	Soil and debris	June 8, 1991	P087	All	May 8, 1992
K010	Soil and debris	June 8, 1991	P089	Soil and debris	June 8, 1991
K011	Soil and debris	June 8, 1991	P092	High mercury non-wastewater.	May 8, 1992
K013	Soil and debris	June 8, 1991			
K014	Soil and debris	June 8, 1991	P092	Low mercury non-wastewater.	May 8, 1992
K023	Soil and debris	June 8, 1991			
K027	Soil and debris	June 8, 1991	P093	Soil and debris	May 8, 1992
K028	Soil and debris	June 8, 1991	P094	Soil and debris	June 8, 1991
K029	Soil and debris	June 8, 1991	P095	Soil and debris	May 8, 1992
K031	Nonwastewater	May 8, 1992	P097	Soil and debris	June 8, 1991
K038	Soil and debris	June 8, 1991			
K039	Soil and debris	June 8, 1991			
K040	Soil and debris	June 8, 1991			

APPENDIX III (continued)
EFFECTIVE DATES

Waste Code	Waste Category	Effective Date	Waste Code	Waste Category	Effective Date
P108	Soil and debris	May 8, 1992	U091	Soil and debris	May 8, 1992
P109	Soil and debris	June 8, 1991	U092	Soil and debris	May 8, 1992
P111	Soil and debris	June 8, 1991	U093	Soil and debris	May 8, 1992
P116	Soil and debris	May 8, 1992	U095	Soil and debris	May 8, 1992
P118	Soil and debris	May 8, 1992	U097	Soil and debris	May 8, 1992
U003	Soil and debris	May 8, 1992	U102	Soil and debris	June 8, 1991
U006	Soil and debris	May 8, 1992	U107	Soil and debris	June 8, 1991
U007	Soil and debris	May 8, 1992	U110	Soil and debris	May 8, 1992
U010	Soil and debris	May 8, 1992	U114	Soil and debris	May 8, 1992
U011	Soil and debris	May 8, 1992	U116	Soil and debris	May 8, 1992
U014	Soil and debris	May 8, 1992	U119	Soil and debris	May 8, 1992
U015	Soil and debris	May 8, 1992	U130	Soil and debris	May 8, 1992
U017	Soil and debris	May 8, 1992	U132	Soil and debris	May 8, 1992
U020	Soil and debris	May 8, 1992	U136	Nonwastewater	May 8, 1992
U021	Soil and debris	May 8, 1992	U143	Soil and debris	May 8, 1992
U026	Soil and debris	May 8, 1992	U148	Soil and debris	May 8, 1992
U028	Soil and debris	June 8, 1991	U149	Soil and debris	May 8, 1992
U033	Soil and debris	May 8, 1992	U150	Soil and debris	May 8, 1992
U034	Soil and debris	May 8, 1992	U151	High mercury non-wastewater.	May 8, 1992
U035	Soil and debris	May 8, 1992			
U038	Soil and debris	May 8, 1992	U151	Low mercury non-wastewater.	May 8, 1992
U041	Soil and debris	May 8, 1992			
U042	Soil and debris	May 8, 1992	U151	Soil and debris	May 8, 1992
U046	Soil and debris	May 8, 1992	U153	Soil and debris	May 8, 1992
U049	Soil and debris	May 8, 1992	U156	Soil and debris	May 8, 1992
U058	Soil and debris	June 8, 1992	U163	Soil and debris	May 8, 1992
U059	Soil and debris	May 8, 1992	U164	Soil and debris	May 8, 1992
U060	Soil and debris	May 8, 1992	U167	Soil and debris	May 8, 1992
U061	Soil and debris	May 8, 1992	U168	Soil and debris	May 8, 1992
U062	Soil and debris	May 8, 1992	U170	All	May 8, 1992
U069	Soil and debris	June 8, 1991	U172	All	May 8, 1992
U073	Soil and debris	May 8, 1992	U174	All	May 8, 1992
U074	Soil and debris	May 8, 1992			
U087	Soil and debris	June 8, 1991			
U088	Soil and debris	June 8, 1991			

CHAPTER SEVEN

LAND BAN CERTIFICATION

prepared by

Universal Waste & Transit

Orient Road

Tampa Florida

Attachment 1

INSTRUCTIONS FOR CUSTOMER NOTIFICATION AND CERTIFICATION

The Hazardous and Solid Waste Amendments of 1984 require restrictions on land disposal of untreated hazardous wastes to be implemented in several phases. The first phase, covering certain solvent and dioxin wastes, was effective November 8, 1986. The second phase (covering "California List" wastes) was effective July 8, 1987. There are very limited variances from these restrictions, and additional wastes will be covered in future phases. For your convenience, a list of restricted wastes and applicable variances is attached. Complete regulations concerning land ban restrictions are published by the Environmental Protection Agency in 40 CFR, Part 268.

In order to comply with federal and state requirements you must sign a statement (either a notification or a certification) for each waste stream you ship. A copy of this statement of the waste, except for the unrestricted waste notification.

Determine which statement below applies to your waste and mark the appropriate corresponding notification or certification on the reverse side of this form.

Unrestricted Waste Notification

If you generate a hazardous waste which is not a solvent, dioxin, or "California List" waste which is restricted from land disposal without prior treatment (by appropriate treatment standard described in 40 CFR 268 Subpart D, or to the levels specified in 40 CFR 268.32), mark this space and list appropriate treatment standard.

Restricted Waste Variance Certification

If you generate a solvent (F001-F005), dioxin, or "California List" waste which does not require treatment prior to land disposal because of a variance (including case-by-case extension under 40 CFR 268.5, nationwide variance under 40 CFR 268 Subpart C, a no-migration petition under 40 CFR 268.6, or soil or debris from a CERCLA response action or RCRA corrective action), mark this space and list the appropriate variance.

Treated Waste Certification

If you treat a solvent (F001-F005), dioxin, or "California List" waste to the degree it is no longer subject to land disposal restrictions (either the performance standards described in 40 CFR 268 Subpart D of the applicable levels described in 40 CFR 268.32), mark this space. Mark this space whether you are the original generator treating the waste of a treatment facility operator. You must also attach analytical documentation that demonstrates required treatment has been achieved, and a copy of the original generator(s) notification which was sent to you with the waste.

ONLY STATEMENTS WITH ORIGINAL SIGNATURES WILL BE ACCEPTED!

CUSTOMER NOTIFICATION AND CERTIFICATION

Generator Name/Location: _____
EPA ID Number: _____
Waste Profile or ARF Number: _____
Manifest Number: _____
EPA Hazardous Waste Number(s): (_____) (_____) (_____) _____
Waste Analysis Available? Yes _____ No _____ If yes, please attach copy.

Unrestricted Waste Notification

I notify that I personally have examined and am familiar with the waste through analysis and testing or through knowledge of the waste to support this notification that the waste is not restricted as specified in 40 CFR 268, Subpart D and all applicable prohibitions set forth in 40 CFR 268.32 or RCRA Section 3004(d).

Restricted Waste Variance Certification

I certify under penalty of law that I personally have examined and am familiar with the waste through analysis and testing or through knowledge of the waste to support this certification that the waste complies with the treatment standards specified in 40 CFR Part 268, Subpart D and all applicable prohibitions set forth in 40 CFR 268.32 or RCRA Section 3004(d). I believe that the information I submitted is true, accurate, and complete. I am aware that there are significant penalties for submitting a false certification, including the possibility of a fine and imprisonment.

Applicable Variance: _____

Treated Waste Certification

I certify under penalty of law that I have personally examined and am familiar with the treatment technology and operation of the treatment process used to support this certification and that, based on my inquiry of those individuals immediately responsible for obtaining this information, I believe that the treatment process has been operated and maintained properly so as to comply with the performance levels specified in 40 CFR Part 268, Subpart D and all applicable prohibitions set forth in 40 CFR 268.32 or RCRA Section 3004(d) without dilution of the prohibited waste. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

SIGNATURE: _____ DATE: _____
PRINT NAME: _____ TITLE: _____

ONLY STATEMENTS WITH ORIGINAL SIGNATURES WILL BE ACCEPTED!

SOLVENT WASTES

- F001 The following spent halogenated solvents used in degreasing tetrachloroethylene, trichloroethylene, methylene chloride, 1,1,1-trichloroethane, carbon tetrachloride, and chlorinated fluorocarbons; all spent solvent mixtures/blends used in degreasing containing, before use, a total of ten percent or more (by volume) or one or more of the above halogenated solvents or those solvents listed in F002, F004, F005 and still bottoms from the recovery of these spent solvent and spent solvent mixtures.
- F002 The following spent halogenated solvents: tetrachloroethylene, methylene chloride, 1,1,1-trichloroethane; chlorobenzene, 1,1,2-trichloro-1, 2, 2-trifluoroethane, ortho-dichlorobenzene, and trichlorofluoromethane; all spent solvent mixtures/blends used in degreasing containing, before use, a total of ten percent or more (by volume) of one or more of the above halogenated solvents or those solvents listed in F001, F004, and F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.
- F003 The following spent non-halogenated solvents: xylene, acetone, ethyl acetate, ethyl benzene, ethyl ether, methyl isobutyl ketone, cyclohexanone, and methanol; all spent solvent mixtures/blends containing, before use, only the above spent non-halogenated solvents, and a total of ten percent or more (by volume) of one or more of those solvents listed in F001, F002, F004, and F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.

- F004 The following spent non-halogenated solvents: cresols, and creysylic acid, and nitrobenzene; all spent solvent mixtures blends containing, before use, a total of ten percent or more (by volume) of one or more of the above non-halogenated solvents or those solvents listed in F001, F002, and F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.
- F005 The following spent non-halogenated solvents: toluene, methyl ethyl ketone, carbon disulfide, isobutanol, pyridine, benzene, 2-ethoxyethanol, and 2-nitropropane; all spent solvent mixtures/blends containing, before use, a total of ten percent or more (by volume) of one or more of the above non-halogenated solvents or those solvents listed in F001, F002, and F004; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.

SOLVENT WASTES APPLICABLE VARIANCES

- (A) The material is an inorganic solid containing 1% or less F001-F005 solvent.
- (B) The material contains a blend of F001-F005 (TOTAL) solvents at concentrations of less tha 10% prior to use.
- (C) The material is pure, un-used P or U-listed solvents.
- (D) The material is waste water with less than 1% total F001-F005 listed solvents.
- (E) Other.

DIOXIN WASTES

- F020 Wastes (except waste water and spent carbon from the production or manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tri- or tetrachlorophenol, or of intermediates used to produce their pesticide derivatives. (This listing does not include wastes from the production of hexachlorophenol from highly purified 2,4,5-tri-chlorophenol.)
- F021 Wastes (except waste water and spent carbon from hydrogen chloride purification) from the production or manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of pentachlorophenol, or of intermediates used to produce its derivatives.
- F022 Wastes (except waste water and spent carbon from hydrogen chloride purification) from the manufacturing used intermediate, or component in a formulating process) of tetra-, penta-, or hexachlorobenzenes under alkaline conditions.
- F023 Wastes (except waste water and spent carbon from hydrogen chloride purification) from the production of materials on equipment previously used for the production or manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tri- and tetrachlorophenols. (This listing does not include wastes from equipment used only for the production or use of Hexachlorophene from highly purified 2,4,5-trichlorophenol.)
- F026 Wastes (except waste water and spent carbon from hydrogen chloride purification) from the production of materials on equipment previously used for the manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tetra-, penta-, or hexachlorobenzene under alkaline conditions.
- F027 Discarded unused formulations containing tri-, tetra- or pentachlorophenol or discarded unused formulation containing compounds derived from these chlorophenols. (This listing does not include formulations containing hexachlorophene synthesized from pre-purified 2,4,5-trichlorophenol as the sole component.)

Attachment 2

"CALIFORNIA LIST" WASTES

Liquid hazardous wastes, including free liquids associated with any solid or sludge, containing free cyanides at concentrations greater than or equal to 1,000 mg/l.

Liquid hazardous wastes, including free liquids associated with any solid or sludge, containing the following metals (or elements) or compounds of these metals (or elements) at concentrations greater than or equal to those speceified below:

arsenic and/or compounds (as As) 500 mg/l
cadmium and/or compounds (as Cd) 100 mg/l
chromium (VI and/or compounds [as Cr VI]) 500 mg/l
lead and/or compounds (as Pb) 500 mg/l
mercury and/or compounds (as Hg) 20 mg/l
nickel and/or compounds (as Ni) 134 mg/l
selenium and/or compounds (as Se) 100 mg/l
thallium and/or compounds (as Ti) 130 mg/l

Note: These materials must be RCRA Regulated Wastes for the restrictions to apply. Materials which contain selenium or thallium, out which are not RCRA wastes are not affected by the disposal restrictions.

Liquid hazardous waste having a pH less than or equal to two (2.0).

Liquid hazardous waste containing polychlorinated biphenyls at concentrations greater than or equal to 50 ppm.

Hazardous wastes containing halogenated organic compounds in total concentration greater than or equal to 1,000 mg/kg.

"CALIFORNIA LIST" APPLICABLE VARIANCES

- (A) Liquid hazardous wastes that contain HOCs in total concentration greater than or equal to 1,000 mg/l but are not waste waters.
- (B) Non-liquid hazardous wastes containing HOCs in total concentrations greater than or equal to 1,000 mg/l.
- (C) Soil or debris generated from a CERCLA response action or a corrective action taken under Sections 3004 or 3008 or RCRA.
- (D) Case-by-case extension.
- (E) No-migration petition.

CUSTOMER NOTIFICATION AND CERTIFICATION

Generator Name/Location: _____

EPA ID Number: _____

Waste Profile _____

Manifest Number: _____

EPA Hazardous Waste Number(s): (_____) (_____)

Waste Analysis Available? Yes _____ No _____ If yes, please attach copy.

_____ Unrestricted Waste Notification (Category 1)

I notify that I personally have examined and am familiar with the waste through analysis and testing or through knowledge of the waste to support this notification that the waste is not restricted as specified in 40 CFR 268, Subpart D and all applicable prohibitions set forth in 40 CFR 268.32 or RCRA Section 3004(d).

_____ Restricted Waste Notification (Category 2)

I notify that I personally have examined and am familiar with the waste through analysis and testing or through knowledge of the waste to support this notification that the waste does not comply with the treatment standards specified in 40 CFR 268, Subpart D and all applicable prohibitions set forth in 40 CFR 268.32 or RCRA Section 3004(d). Therefore, the waste must be treated by the appropriate regulatory treatment standard or in such a manner which renders it non-liquid by chemical fixation or solidification prior to land disposal.

Corresponding Treatment Standard: _____

_____ Restricted Waste Variance Certification/Notification (Category 3)

I notify pursuant to 40 CFR 268.7(a)(3) and certify under penalty of law that I personally have examined and am familiar with the waste through analysis and testing or through knowledge of the waste to support this certification that the waste complies with the treatment standards specified in 40 CFR Part 268, Subpart D and all applicable prohibitions set forth in 40 CFR 268.32 or RCRA Section 3004(d). I believe that the information I submitted is true, accurate, and complete. I am aware that there are significant penalties for submitting a false certification, including the possibility of a fine and imprisonment.

Applicable Variance: _____

_____ Treated Waste Certification (Category 4)

I certify under penalty of law that I have personally examined and am familiar with the treatment technology and operation of the treatment process used to support this certification and that, based on my inquiry of those individuals immediately responsible for obtaining this information, I believe that the treatment process has been operated and maintained properly so as to comply with the performance levels specified in 40 CFR Part 268, Subpart D and all applicable prohibitions set forth in 40 CFR 268.32 or RCRA Section 3004(d) without dilution of the prohibited waste. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

_____ Soft Hammer Waste Certification (Category 5)

—(5A) I certify under penalty of law that the requirements of 40 CFR 268.8(a)(1) have been met and that disposal in a landfill or surface impoundment is the only practical alternative to treatment currently available. I believe that the information submitted is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine or imprisonment.

—(5B) I certify under penalty of law that the requirements of 40 CFR 268.8(a)(1) have been met and that I have contracted to treat my waste (or will otherwise provide treatment) by the practically available technology which yields the greatest environmental benefit, as indicated in my demonstration. I believe that the information submitted is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

—(5C) I certify under penalty of law that I have personally examined and am familiar with the treatment technology and operation of the treatment process used to support this certification and that, based on my inquiry of those individuals immediately responsible for obtaining this information, I believe that the treatment process has been operated and maintained properly so as to comply with treatment as specified in the generator's demonstration. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

SIGNATURE: _____ DATE: _____

PRINT NAME: _____ TITLE: _____

ONLY STATEMENTS WITH ORIGINAL SIGNATURES WILL BE ACCEPTED!

(Continued on following pages)

Subpart D—Treatment Standards
(continued)

9. In § 268.41 (a) in the F001-F005 spent solvents table. Methylene chloride (from the pharmaceutical industry) and its corresponding concentrations is removed, and the following subtables are added to read as follows; § 268.41—Treatment standards expressed as concentrations in waste extract.

(a) * * *

TABLE CCWE.—CONSTITUENT
CONCENTRATIONS IN WASTE EXTRACT
37

F006 nonwastewaters (see also Table CCW in § 268.43)	Concentration (in mg/l)
Cadmium.....	0.066
Chromium (Total).....	5.2
Lead.....	.51
Nickel.....	.32
Silver.....	.072
Cyanides (Total).....	Reserved
38	
K001 nonwastewaters (see also Table in § 268.43)	Concentration (in mg/l)
Lead.....	0.51
39	
K022 nonwastewaters (see also Table CCW in § 268.43)	Concentration (in mg/l)
Chromium (Total).....	5.2
Nickel.....	0.32
40	
K046 nonwastewaters (Nonreactive Subcategory)	Concentration (in mg/l)
Lead.....	0.18
41	
K048, K049, K050, K051 and K052 nonwastewaters (see also Table CCW in § 268.43)	Concentration (in mg/l)
Arsenic.....	0.004
Chromium (Total).....	1.7
Nickel.....	.048
Selenium.....	.025
42	
K061 nonwastewaters (Low Zinc Subcategory—less than 15% total zinc)	Concentration (in mg/l)
Cadmium.....	0.14
Chromium (Total).....	5.2
Lead.....	.24
Nickel.....	.32

43

K061 nonwastewaters (High Zinc Subcategory—15% or greater total zinc): effective until 8/8/90	Concentration (in mg/l)
Cadmium.....	0.14
Chromium (Total).....	5.2
Lead.....	.24
Nickel.....	.32
44	
K062 nonwastewaters	Concentration (in mg/l)
Chromium (Total).....	0.094
Lead.....	0.37
45	
K071 nonwastewaters	Concentration (in mg/l)
Mercury.....	0.025
46	
K086 nonwastewaters (Solvent Washes Subcategory) see also Table CCW in § 268.43	Concentration (in mg/l)
Chromium (Total).....	0.094
Lead.....	.37
47	
K087 nonwastewaters (see also Table CCW in § 268.43)	Concentration (in mg/l)
Lead.....	0.51
48	
K101 and K102 nonwastewaters (Low Arsenic Subcategory—less than 1% Total Arsenic) (see also Table CCW in § 268.43)	Concentration (in mg/l)
Cadmium.....	0.066
Chromium (Total).....	5.2
Lead.....	.51
Nickel.....	.32

§ 268.42 Treatment - standards expressed as specified technologies.

(a) * * *

(2) Nonliquid hazardous wastes containing halogenated organic compounds (HOCs) in total concentration greater than or equal to 1,000 mg/kg and liquid HOC-containing wastes that are prohibited under § 268.32(e)(1) of this part must be incinerated in accordance with the requirements of Part 264 Subpart 0 or Part 265 Subpart 0, or in boilers or industrial furnaces burning in accordance with applicable regulatory standards. These treatment standards do not apply where the waste is subject to a Part 268 Subpart C treatment standard for a specific HOC (such as a hazardous waste chlorinated solvent for which a treatment standard is established under § 268.41(a).

§ 268.43 - Treatment standards expressed as waste concentrations.

(a) Table CCW identifies the restricted wastes and the concentrations of their associated hazardous constituents which may not be exceeded by the waste or treatment residual (not an extract of such waste or residual) for the allowable land disposal of such waste or residual.

TABLE CCW—CONSTITUENT
CONCENTRATIONS IN WASTES

49

F001, F002, F003, F004 and F005 wastewaters (Pharmaceutical Industry)	Concentration (in mg/l)
Methylene chloride.....	0.44
50	
F006 nonwastewaters (see also Table CCWE in § 268.41)	Concentration (in mg/kg)
Cyanides (Total).....	Reserved
51	
K001 nonwastewaters (see also Table CCWE in § 268.41)	Concentration (in mg/kg)
Naphthalene.....	8.0
Pentachlorophenol.....	37
Phenanthrene.....	8.0
Pyrene.....	7.3
Toluene.....	.14
Xylenes.....	.16
52	
K001 wastewaters	Concentration (in mg/l)
Naphthalene.....	0.15
Pentachlorophenol.....	.88
Phenanthrene.....	.15
Pyrene.....	.14
Toluene.....	.14
Xylenes.....	.16
Lead.....	.037

§ 268.43 Treatment Standards
Expressed as Waste Concentrations
(Continued)

53

K015 wastewaters	Concentration (in mg/l)
Anthracene.....	1.0
Benzal chloride.....	.28
Benzo (b and/or k) fluoranthene.....	.29
Phenanthrene.....	.27
Toluene.....	.15
Chromium (Total).....	.32
Nickel.....	.44

54

K016 nonwastewaters	Concentration (in mg/kg)
Hexachlorobenzene.....	28
Hexachlorobutadiene.....	5.6
Hexachlorocyclopentadiene.....	5.6
Hexachloroethane.....	28
Tetrachloroethene.....	6.0

55

K016 wastewaters	Concentration (in mg/l)
Hexachlorobenzene.....	0.033
Hexachlorobutadiene.....	.007
Hexachlorocyclopentadiene.....	.007
Hexachloroethane.....	.033
Tetrachloroethene.....	.007

56

K018 nonwastewaters	Concentration (in mg/kg)
Chloroethane.....	6.0
1,1-Dichloroethane.....	6.0
1,2-Dichloroethane.....	6.0
Hexachlorobenzene.....	28
Hexachlorobutadiene.....	5.6
Hexachloroethane.....	28
Pentachloroethane.....	5.6
1,1,1-Trichloroethane.....	6.0

57

K018 wastewaters	Concentration (in mg/l)
Chloroethane.....	0.007
Chloromethane.....	.007
1,1-Dichloroethane.....	.007
1,2-Dichloroethane.....	.007
Hexachlorobenzene.....	.033
Hexachlorobutadiene.....	.007
Pentachloroethane.....	.007
1,1,1-Trichloroethane.....	.007

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K019 nonwastewaters	Concentration (in mg/kg)
Bis(2-chloroethyl)ether.....	5.6
Chlorobenzene.....	6.0
Chloroform.....	6.0
1,2-Dichloroethane.....	6.0
Hexachloroethane.....	28
Naphthalene.....	5.6
Phenanthrene.....	5.6
Tetrachloroethene.....	6.0
1,2,4-Trichlorobenzene.....	19
1,1,1-Trichloroethane.....	6.0

59

K019 wastewaters	Concentration (in mg/l)
Bis(2-chloroethyl)ether.....	0.007
Chlorobenzene.....	.006
Chloroform.....	.007
p-Dichlorobenzene.....	.008
1,2-Dichloroethane.....	.007
Fluorene.....	.007
Hexachloroethane.....	.033
Naphthalene.....	.007
Phenanthrene.....	.007
1,2,4,5-Tetrachlorobenzene.....	.017
Tetrachloroethene.....	.007
1,2,4-Trichlorobenzene.....	.023
1,1,1-Trichloroethane.....	.007

60

K020 nonwastewaters	Concentration (in mg/kg)
1,2-Dichloroethane.....	6.0
1,1,2,2-Tetrachloroethane.....	5.6
Tetrachloroethene.....	6.0

61

K020 wastewaters	Concentration (in mg/l)
1,2-Dichloroethane.....	0.007
1,1,2,2-Tetrachloroethane.....	.007
Tetrachloroethene.....	.007

62

K022 nonwastewaters (see also Table CCWE in § 268.41)	Concentration (in mg/kg)
Acetophenone.....	19
Sum of Diphenylamine and Diphenyl-nitrosamine.....	13
Phenol.....	12
Toluene.....	0.034

63

K024 nonwastewaters	Concentration (in mg/kg)
Phthalic acid.....	28

64

K024 wastewaters	Concentration (in mg/l)
Phthalic acid.....	0.54

65

K030 nonwastewaters	Concentration (in mg/kg)
Hexachlorobutadiene.....	5.6
Hexachloroethane.....	28
Hexachloropropene.....	19
Pentachlorobenzene.....	28
Pentachloroethane.....	5.6
1,2,4,5-Tetrachlorobenzene.....	14
Tetrachloroethene.....	6.0
1,2,4-Trichlorobenzene.....	19

66

K030 nonwastewaters	Concentration (in mg/l)
o-Dichlorobenzene.....	0.008
p-Dichlorobenzene.....	.008
Hexachlorobutadiene.....	.007
Hexachloroethane.....	.033
Pentachloroethane.....	.007
1,2,4,5-Tetrachlorobenzene.....	.017
Tetrachloroethene.....	.007
1,2,4-Trichlorobenzene.....	.023

67

K037 nonwastewaters	Concentration (in mg/kg)
Disulfoton.....	0.1
Toluene.....	28

68

K037 wastewaters	Concentration (in mg/l)
Disulfoton.....	0.003
Toluene.....	.028

69

K048 nonwastewaters (see also Table CCWE in § 268.41)	Concentration (in mg/kg)
Benzene.....	9.5
Benzo(a)pyrene.....	.84
Bis(2-ethylhexyl)phthalate.....	37
Chrysene.....	2.2
Di-n-butyl phthalate.....	4.2
Ethylbenzene.....	67
Naphthalene.....	[Reserved]
Phenanthrene.....	7.7
Phenol.....	2.7
Pyrene.....	2.0
Toluene.....	9.5
Xylenes.....	[Reserved]
Cyanides (Total).....	1.8

70

K048 wastewaters	Concentration (in mg/l)
Benzene.....	0.011
Benzo(a)pyrene.....	.047
Bis(2-ethylhexyl)phthalate.....	.043
Chrysene.....	.043
Di-n-butyl phthalate.....	.060
Ethylbenzene.....	.011
Fluorene.....	.050
Naphthalene.....	.033
Phenanthrene.....	.039
Phenol.....	.047
Pyrene.....	.045
Toluene.....	.011
Xylenes.....	.011
Chromium (Total).....	.20
Lead.....	0.37

§ 268.43 Treatment Standards Expressed as Waste Concentrations
(Continued)

1

K049 nonwastewaters (see also Table CCWE in § 268.41)	Concentration (in mg/kg)
Anthracene.....	6.2
Benzene.....	9.5
Benzo(a)pyrene.....	0.64
Bis(2-ethylhexyl)phthalate.....	37
Chrysene.....	2.2
Ethylbenzene.....	67
Naphthalene.....	[Reserved]
Phenanthrene.....	7.7
Phenol.....	2.7
Pyrene.....	2.0
Toluene.....	9.5
Xylenes.....	[Reserved]
Cyanides (Total).....	1.8

72

K049 wastewaters	Concentration (in mg/l)
Anthracene.....	0.039
Benzene.....	.011
Benzo(a)pyrene.....	.047
Bis(2-ethylhexyl)phthalate.....	.043
Carbon disulfide.....	.011
Chrysene.....	.043
2,4-Dimethylphenol.....	.033
Ethylbenzene.....	.011
Naphthalene.....	.033
Phenanthrene.....	.059

73

K049 wastewaters	Concentration (in mg/l)
Phenol.....	.047
Pyrene.....	.045
Toluene.....	.011
Xylenes.....	.011
Chromium (Total).....	.20
Lead.....	.037

74

K050 nonwastewaters (see also Table CCWE in § 268.41)	Concentration (in mg/kg)
Benzo(a)pyrene.....	0.84
Phenol.....	2.7
Cyanides (Total).....	1.8

75

K050 wastewaters	Concentration (in mg/l)
Benzo(a)pyrene.....	0.047
Phenol.....	.047
Chromium (Total).....	.20
Lead.....	.037

76

K051 nonwastewaters (see also Table CCWE in § 268.41)	Concentration (in mg/kg)
Anthracene.....	6.2
Benzene.....	9.5
Benzo(a)anthracene.....	1.4
Benzo(s)pyrene.....	.84
Bis(2-ethylhexyl)phthalate.....	37
Chrysene.....	2.2
Di-n-butyl phthalate.....	4.2
Ethylbenzene.....	67
Naphthalene.....	[Reserved]
Phenanthrene.....	7.7
Phenol.....	2.7
Pyrene.....	2.0
Toluene.....	9.5
Xylenes.....	[Reserved]
Cyanides (Total).....	1.8

77

K051 wastewaters	Concentration (in mg/l)
Acenaphthene.....	0.050
Anthracene.....	.039
Benzene.....	.011
Benzo(a)anthracene.....	.043
Benzo(a)pyrene.....	.047
Bis(2-ethylhexyl) phthalate.....	.043
Chrysene.....	.043
Di-n-butyl phthalate.....	.060
Ethylbenzene.....	.011
Flourene.....	.050
Naphthalene.....	.033
Phenanthrene.....	.039
Phenol.....	.047
Pyrene.....	.045
Toluene.....	.011
Xylenes.....	.011
Chromium (Total).....	.20
Lead.....	.037

78

K052 nonwastewaters (see also Table CCWE in § 268.41)	Concentration (in mg/kg)
Benzene.....	9.5
Benzo(a)pyrene.....	0.84
o-Cresol.....	2.2
p-Cresol.....	0.90
Ethylbenzene.....	67
Naphthalene.....	[Reserved]
Phenanthrene.....	7.7
Phenol.....	2.7
Toluene.....	9.5
Xylenes.....	[Reserved]
Cyanides (Total).....	1.8

79

K052 wastewaters	Concentration (in mg/l)
Benzene.....	0.011
Benzo(a)pyrene.....	.047
o-Cresol.....	.011
p-Cresol.....	.011
2,4-Dimethylphenol.....	.033
Ethylbenzene.....	.011
Naphthalene.....	.033
Phenanthrene.....	.039
Phenol.....	.047
Toluene.....	.011
Xylenes.....	.011
Chromium (Total).....	.20
Lead.....	.037

80

K062 wastewaters	Concentration (in mg/l)
Chromium (Total).....	0.32
Lead.....	.04
Nickel.....	.44

81

K071 wastewaters	Concentration (in mg/l)
Mercury.....	0.030

82

K086 nonwastewaters—Solvent Washes Subcategory (see also Table CCWE in § 268.41)	Concentration (in mg/kg)
Acetone.....	0.37
Bis(2-ethylhexyl) phthalate.....	.49
n-Butyl alcohol.....	.37
Cyclohexanone.....	.49
1,2-Dichlorobenzene.....	.49
Ethyl acetate.....	.37
Ethyl benzene.....	.031
Methanol.....	.37
Methylene chloride.....	.037
Methyl ethyl ketone.....	.37
Methyl isobutyl ketone.....	.37
Naphthalene.....	.49
Nitrobenzene.....	.49
Toluene.....	.031
1,1,1-Trichloroethane.....	.044
Trichloroethylene.....	.031
Xylenes.....	.015

83

K036 wastewaters—Solvent Washes Subcategory	Concentration (in mg/l)
Acetone.....	0.015
bis(2-ethylhexyl)phthalate.....	.044

84

K086 wastewaters—Solvent Washes Subcategory	Concentration (in mg/l)
n-Butyl alcohol.....	.031
Cyclohexanone.....	.022
1,2-Dichlorobenzene.....	.044
Ethyl acetate.....	.031
Ethyl benzene.....	.015
Methanol.....	.031
Methylene chloride.....	.031
Methyl ethyl ketone.....	.031
Methyl isobutyl ketone.....	.031
Naphthalene.....	.044
Nitrobenzene.....	.044
Toluene.....	.029
1,1,1-Trichloroethane.....	.031
Trichloroethylene.....	.029
Xylenes.....	.015
Chromium (Total).....	.32
Lead.....	.037

§ 268.43 Treatment Standards
Expressed as Waste Concentrations
(Continued)

85

K087 nonwastewaters (see also Table CCWE in § 268.41)	Concentra- tion (in mg/ kg)
Acenaphthalene.....	3.4
Benzene.....	.071
Chrysene.....	3.4
Fluoranthene.....	3.4
Indeno (1,2,3-cd) pyrene.....	3.4
Naphthalene.....	3.4
Phenanthrene.....	3.4
Toluene.....	.65
Xylenes.....	.070

86

K067 wastewaters	Concentra- tion (in mg/ l)
Acenaphthalene.....	0.028
Benzene.....	.014
Chrysene.....	.028
Fluoranthene.....	.028
Indeno (1,2,3-cd) pyrene.....	.028
Naphthalene.....	.028
Phenanthrene.....	.028
Toluene.....	.008
Xylenes.....	.014
Lead.....	.037

87

K099 nonwastewaters	Concentra- tion (in mg/ kg)
2,4-Dichlorophenoxyacetic acid.....	1.0
Hexachlorodibenzo-p-dioxins.....	.001
Hexachlorodibenzofurans.....	.001
Pentachlorodibenzo-p-dioxins.....	.001
Pentachlorodibenzofurans.....	.001
Tetrachlorodibenzo-p-dioxins.....	.001
Tetrachlorodibenzofurans.....	.001

88

K099 wastewaters	Concentra- tion (in mg/ l)
2,4-Dichlorophenoxyacetic acid.....	1.0
Hexachlorodibenzo-p-dioxins.....	.001
Hexachlorodibenzofurans.....	.001
Pentachlorodibenzo-p-dioxins.....	.001
Pentachlorodibenzofurans.....	.001
Tetrachlorodibenzo-p-dioxins.....	.001
Tetrachlorodibenzofurans.....	.001

89

K101 nonwastewaters (Low Arsenic Subcategory—less than 1% total arsenic) (See also Table CCWE in § 268.41)	Concentra- tion (in mg/ kg)
Ortho-Nitroaniline.....	14

90

K101 wastewaters	Concentra- tion (in mg/ l)
Ortho-Nitroaniline.....	0.27
Arsenic.....	2.0
Cadmium.....	.24
Lead.....	.11
Mercury.....	.027

91

K102 nonwastewaters (Low Arsenic Subcategory—less than 1% total arsenic) (see also Table CCWE in § 268.41)	Concentra- tion (in mg/ kg)
Ortho Nitrophenol.....	13

92

K102 wastewaters	Concentra- tion (in mg/ l)
Ortho-Nitrophenol.....	0.028
Arsenic.....	2.0
Cadmium.....	.24
Lead.....	.11
Mercury.....	.027

93

K103 nonwastewaters	Concentra- tion (in mg/ kg)
Aniline.....	5.6
Benzene.....	6.0
2,4-Dinitrophenol.....	5.6
Nitrobenzene.....	5.6
Phenol.....	5.6

94

K103 wastewaters	Concentra- tion (in mg/ l)
Aniline.....	4.5
Benzene.....	.15
2,4-Dinitrophenol.....	.61
Nitrobenzene.....	.073
Phenol.....	1.4

95

K104 nonwastewaters	Concentra- tion (in mg/ kg)
Aniline.....	5.6
Benzene.....	6.0
2,4-Dinitrophenol.....	5.6
Nitrobenzene.....	5.6
Phenol.....	5.6
Cyanides (Total).....	1.8

96

K104 wastewaters	Concentra- tion (in mg/ l)
Aniline.....	4.5
Benzene.....	.15
2,4-Dinitrophenol.....	.61

98

K104 wastewaters	Concentra- tion (in mg/ l)
Nitrobenzene.....	.073
Phenol.....	1.4
Cyanides (Total).....	2.7

SUMMARY OF LAND DISPOSAL RESTRICTIONS

I. WASTES AFFECTED BY THE LAND DISPOSAL RESTRICTIONS

Exhibit #1 lists all of the waste streams restricted from land disposal (except by deep well injection). The list includes both the solvent and dioxin wastes banned on November 8, 1986 and the California List banned on July 8, 1987.

NOTE: Appendix III to Part 268-Lists out the halogenated organic compounds (HOC) regulated under the California List.

II. VARIANCES

Currently there are nationwide variances and exemptions that allow certain restricted wastes to be landfill under specific conditions. The specific are listed in Exhibit #2. Below are some examples of variances:

- A. F001-F005 wastes that contain less than 1% of the listed solvents are entitled to a 2 year national variance effective November 8, 1986 due to the lack of existing treatment capacity (40 CFR 268.30). Exception: Methylene Chloride wastewater from pharmaceutical manufacturing. The variance is due to end on November 8, 1988.
- B. Liquid HOC wastes that contain greater than 1,000 mg/l HOC's which are not wastewaters and non-liquid HOC wastes that contain greater than 1000 mg/l HOC's are restricted from land disposal. Both are entitled to a national capacity variance effective until November 8, 1988 due to the lack of national capacity (40 CFR 268.32).
- C. Small quantity generators that produce less than 100 kg per month are exempted from the land disposal restrictions by regulations.
- D. Those wastes that are not RCRA regulated but do contain regulated constituents are not restricted from land disposal (i.e. nickel, thallium) by regulation.
- E. K048-K052 and K071 are entitled to a 2 national capacity variance effective August 8, 1988 due to lack of existing treatment capacity (40 CFR 268.30).

III. TREATMENT STANDARDS

Restricted wastes that are treated prior to land disposal must meet certain treatment standards which may be required by treatment technology or concentration levels in treatment residues. Exhibit #3 lists the specific standards required under the Rule (40 CFR 268.41 and 268.42).

REGULATIONS EFFECTIVE AUGUST 8, 1988

I. First third waste codes that have had treatment standards developed:

F006	K001	K004	K008	K015	K016	K018	K019	K020
K021	K022	K024	K025	K030	K036	K037	K044	K045
K046	K047	K048	K049	K050	K051	K052	K060	K061
K062	K069	K071	K073	K083	K086	K087	K099	K100
K101	K102	K103	K104					

II. Those waste codes that have received a two year national capacity variance.

K048	K049	K050	K051	K052	K071
------	------	------	------	------	------

III. Rescission of earlier variances:

(A) F001-F005 - Pharmaceutical wastewater for Methylene Chloride/BDAT - steam stripping.

(B) Hazardous wastes containing halogenated organic compounds (HOC), Appendix III, in concentrations greater than or equal to 1,000 mg/l, except for California list HOC contaminated soils/BDAT-Incineration (Effective November 8, 1988).

(C) Solvent waste generated from section 104 or 106 response actions under CERCLA or RCRA corrective action, except where the waste is contaminated soil and debris.

SOLVENT WASTES

- F001.** . . The following spent halogenated solvents used in degreasing: tetrachloroethylene, trichloroethylene, methylene chloride, 1,1,1-trichloroethane, carbon tetrachloride, and chlorinated fluorocarbons; all spent solvent mixtures/blends used in degreasing containing, before use, a total of ten percent or more (by volume) or one or more of the above halogenated solvents or those solvents listed in F002, F004, F005 and still bottoms from the recovery of these spent solvent and spent solvent mixtures.
- F002.** . . The following spent halogenated solvents: tetrachloroethylene, methylene chloride, 1,1,1-trichloroethane, chlorobenzene, 1,1,2-trichloro-1,2,2-trifluoroethane, ortho-dichlorobenzene, and trichlorofluoromethane; all spent solvent mixtures/blends used in degreasing containing, before use, a total of ten percent or more (by volume) of one or more of the above halogenated solvents or those solvents listed in F001, F004, and F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.
- F003.** . . The following spent non-halogenated solvents: xylene, acetone, ethyl acetate, ethyl benzene, ethyl ether, methyl isobutyl ketone, cyclohexanone, and methanol; all spent solvent mixtures/Blends containing, before use, only the above spent non-halogenated solvents, and a total of ten percent or more (by volume) of one or more of those solvents listed in F001, F002, F004, and F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.
- F004.** . . The following spent non-halogenated solvents: cresols, and creosylic acid, and nitrobenzene; all spent solvent mixtures/blends containing, before use, a total of ten percent or more (by volume) of one or more of the above non-halogenated solvents or those solvents listed in F001, F002, and F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.
- F005.** . . The following spent non-halogenated solvents: toluene, methyl ethyl ketone, carbon disulfide, isobutanol, pyridine, benzene, 2-ethoxyethanol, and 2-nitropropane; all spent solvent mixtures/blends containing, before use, a total of ten percent or more (by volume) of one or more of the above non-halogenated solvents or those solvents listed in F001, F002, and F004; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.

September 23, 1988

DIOXIN WASTES

- F020.** . . Wastes (except wastewater and spent carbon from the production or manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tri- or tetrachlorophenol, or of intermediates used to produce their pesticide derivatives. (This listing does not include wastes from the production of hexachlorophena from highly purified 2,4,5-tri-chlorophenol.)
- F021.** . . Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production or manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of pentachlorophenol, or of intermediates used to product its derivatives.
- F022.** . . Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the manufacturing used intermediate, or component in a formulating process) of tetra-, penta-, or hexachlorobenzenes under alkaline conditions.
- F023.** . . Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production of materials on equipment previously used for the production or manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tri- and tetrachlorophenols. (This listing does not include wastes from equipment used only for the production or use of Hexachlorophene from highly purified 2,4,5-trichlorophenol.)
- F026.** . . Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production of materials on equipment previously used for the manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) or tetra-, penta-, or hexachlorobenzene under alkaline conditions.
- 27.** . . Discarded unused formulations containing tri-, tetra-, or pentachlorophenol or discarded unused formulation containing compounds derived from these chlorophenols. (This listing does not include formulations containing Hexachlorophene synthesized from pre-purified 2,4,5-trichlorophenol as the sole component.)

September 23, 1988

Solvents and Dioxins

On November 7, 1986, EPA promulgated a final rule that established a framework for implementing the congressionally mandated land disposal prohibitions (51 FR 40572). The rule established procedures for establishing treatment standards, for granting nationwide variances from statutory effective dates, for granting extensions of effective dates on a case-by-case basis, for evaluating petitions allowing variances from the treatment standard, and for evaluating petitions demonstrating that continued land disposal is protective of human health and the environment. In addition, the November 7, 1986 final rule established treatment standards and effective dates for wastes included in the first phase of the land disposal prohibitions: certain solvent-containing and dioxin-containing hazardous wastes.

California List

Today's rule addresses the second phase of the land disposal restrictions i.e., the California list wastes. The California list consists of liquid hazardous wastes containing certain metals, free cyanides, polychlorinated biphenyls (PCBs), corrosives with a pH of less than or equal to two (2.0), and liquid and nonliquid hazardous wastes containing halogenated organic compounds (HOCs) as described below

(A) Liquid hazardous wastes, including free liquids associated with any solid or sludge, containing free cyanides at concentrations greater than or equal to 1,000 mg/l.

(B) Liquid hazardous wastes, including free liquids associated with any solid or sludge, containing the following metals (or elements) or compounds of these metals (or elements) at concentrations greater than or equal to those specified below:

(i) Arsenic and/or compounds (as As) 500 mg/l;

(ii) Cadmium and/or compounds (as Cd) 100 mg/l;

(iii) Chromium (VI and/or compounds (as Cr VI)) 500 mg/l;

(iv) Lead and/or compounds (as Pb) 500 mg/l;

(v) Mercury and/or compounds (as Hg) 20 mg/l;

(vi) Nickel and/or compounds (as Ni) 134 mg/l

(vii) Selenium and/or compounds (as Se) 100 mg/l; and

(viii) Thallium and/or compounds (as Tl) 130 mg/l;

(C) Liquid hazardous wastes having a pH less than or equal to two (2.0).

(D) Liquid hazardous wastes containing polychlorinated biphenyls at concentrations greater than or equal to 50 ppm.

(E) Hazardous wastes containing halogenated organic compounds in total concentration greater than or equal to 1,000 mg/kg.

Collectively, these hazardous wastes are referred to as the California list because the State of California developed regulations to restrict the land disposal of hazardous wastes containing these constituents, and Congress subsequently incorporated these prohibitions into the 1984 Amendments to RCRA. (RCRA sections 3004(d)(1) and (2), 42 U.S.C. 6924(d)(1), and (2)). Congress intended the California list prohibitions as a starting point in carrying out the congressional mandate to minimize land disposal of hazardous waste. Congress' intent in specifying threshold levels for the land disposal of California list wastes was to avoid time-consuming litigation over the selection of appropriate levels. However, section 3004(d)(2) of RCRA directs the Agency to substitute more stringent concentration levels where necessary to protect human health and the environment.

Appendix III to Part 268—List of Halogenated Organic Compounds Regulated Under § 268.32.

In determining the concentration of HOCs in a hazardous waste for purposes of the § 268.32 land disposal prohibition, EPA has defined the HOCs that must be included in the calculation as any compounds having a carbon-halogen bond which are listed in this Appendix (see § 268.2). Appendix III to Part 268 consists of the following compounds:

Volatiles

Bromodichloromethane
Bromomethane
Carbon Tetrachloride
Chlorobenzene
2-Chloro-1,3-butadiene
Chlorodibromomethane
Chloroethane
2-Chloroethyl vinyl ether
Chloroform
Chloromethane
3-Chloropropene
1,2-Dibromo-3-chloropropane
1,2-Dibromomethane
Dibromomethane
Trans-1,4-Dichloro-2-butene
Dichlorodifluoromethane
1,1-Dichloroethane
1,2-Dichloroethane
1,1-Dichloroethylene
Trans-1,2-Dichloroethene
1,2-Dichloropropane
Trans-1,3-Dichloropropene
cis-1,3-Dichloropropene
Iodomethane
Methylene chloride
1,1,1,2-Tetrachloroethane
1,1,2,2-Tetrachloroethane
Tetrachloroethene
Tribromomethane
1,1,1-Trichloroethane
1,1,2-Trichloroethane
Trichloroethane
Trichloromonofluoromethane
1,2,3-Trichloropropane
Vinyl chloride

Semivolatiles

Bis(2-chloroethoxy)ethane
Bis(2-chloroethyl)ether
Bis(2-chloroisopropyl)ether
p-Chloroaniline
Chlorobenzilate
p-Chloro-m-cresol
2-Chloronaphthalene
2-Chlorophenol
3-Chloropropionitrile
m-Dichlorobenzene
o-Dichlorobenzene
p-Dichlorobenzene
3,3-Dichlorobenzidine
2,4-Dichlorophenol
2,6-Dichlorophenol
Hexachlorobenzene
Hexachlorobutadiene
Hexachlorocyclopentadiene
Hexachloroethane
Hexachloropropene
Hexachloropropene
4,4-Methylenebis(2-chloroaniline)
Pentachlorobenzene
Pentachloroethane
Pentachloronitrobenzene
Pentachlorophenol
Pronamide
1,2,4,5-Tetrachlorobenzene
2,3,4,6-Tetrachlorophenol
1,2,4-Trichlorobenzene
2,4,5-Trichlorophenol
2,4,6-Trichlorophenol
Tris(2,3-dibromopropyl)phosphate

Organochlorine Pesticides

Aldrin
alpha-BHC
beta-BHC
delta-BHC
gamma-BHC
Chlordane
DDD
DDE
DIT
Dieldrin
Endosulfan I
Endosulfan II
Endrin
Endrin aldehyde
Heptachlor
Heptachlor epoxide
Isodrin
Kepone
Methoxychlor
Toxaphene

Phenoxyacetic Acid Herbicides

2,4-Dichlorophenoxyacetic acid
Silvex
2,4,5-T

PCBs

Aroclor 1016
Aroclor 1221
Aroclor 1232
Aroclor 1242
Aroclor 1248
Aroclor 1254
Aroclor 1260
PCBs not otherwise specified

Dioxins and Furans

Hexachlorodibenzo-p-dioxins
Hexachlorodibenzofuran
Pentachlorodibenzo-p-dioxins
Pentachlorodibenzofuran
Tetrachlorodibenzo-p-dioxins
Tetrachlorodibenzofuran
2,3,7,8-Tetrachlorodibenzo-p-dioxin

**THOSE WASTES CODES UNDERLINED ARE WASTES
THAT HAVE TREATMENT STANDARDS SET,
THE REMAINDER ARE SOFT HAMMER WASTES**

§268.10 Identification of wastes to be evaluated by August 8, 1988.

EPA will take action under sections 3004(g)(5) and 3004(m), of the Resource Conservation and Recovery Act, by August 8, 1988, for the following wastes (for ease of understanding the wastes have been listed by the section of 40 CFR Part 261 under which they were listed):

§261.31 Wastes

F006 — Wastewater treatment sludges from electroplating operations except from the following processes: (1) Sulfuric acid anodizing of aluminum; (2) tin plating on carbon steel; (3) zinc plating (segregated basis) on carbon steel; (4) aluminum or zinc-aluminum plating on carbon steel; (5) cleaning/stripping associated with tin, zinc and aluminum plating on carbon steel; and (6) chemical etching and milling of aluminum.

F007 — Spent cyanide plating bath solutions from electroplating operations.

F008 — Plating bath sludges from the bottom of plating baths from electroplating operations where cyanides are used in the process.

F009 — Spent stripping and cleaning bath solutions from electroplating operations where cyanides are used in the process.

F019 — Wastewater treatment sludges from the chemical conversion coating of aluminum.

§261.32 Wastes

K001 — Bottom sediment sludge from the treatment of wastewaters from wood preserving processes that use creosote and/or pentachlorophenol.

K004 — Wastewater treatment sludge from the production of zinc yellow pigments.

K008 — Over residue from the production of chrome oxide green pigments.

K011 — Bottom stream from the wastewater stripper in the production of acrylonitrile.

K013 — Bottom stream from the acetonitrile column on the production of acrylonitrile.

K014 — Bottoms from the acetonitrile purification column in the production of acrylonitrile.

K015 — Still bottoms from the distillation of benzyl chloride.

K016 — Heavy ends or distillation residues from the production of carbon tetrachloride.

K017 — Heavy ends (still bottoms) from the purification column in the production of epichlorohydrin.

K018 — Heavy ends from the fractionation column in ethyl chloride production.

K020 — Heavy ends from the distillation of vinyl chloride in vinyl chloride monomer production.

K021 — Aqueous spent antimony catalyst waste from fluoromethanes production.

K022 — Distillation bottom tars from the production of phenol/acetone from cumene.

K024 — Distillation bottoms from the production of phthalic anhydride from naphthalene.

K030 — Column bottom or heavy ends from the combined production of trichloroethylene and perchloroethylene.

K031 — By-products salts generated in the production of MSMA and cacodylic acid.

K035 — Wastewater treatment sludges generated in the production of creosote.

K036 — Still bottoms from toluene reclamation distillation in the production of disulfoton.

K037 — Wastewater treatment sludge from the production of disulfoton.

K044 — Wastewater treatment sludges from the manufacturing and processing of explosives.

K045 — Spent carbon from the treatment of wastewater containing explosives.

K046 — Wastewater treatment sludges from the manufacturing, formulation and loading of lead-based initiating compounds.

K047 — Pink/red water from TNT operations.

K048 — Dissolved air flotation (DAF)

K049 — Stop oil emulsion solids from the petroleum refining industry.

K050 — Heat exchange bundle cleaning sludge from the petroleum refining industry.

K051 — API separator sludge from the petroleum refining industry.

K052 — Tank bottoms (lead) from the petroleum refining industry.

K019 — Heavy Ends from the Distillation of Ethylene Dichloride Production

K025 — Distillation bottoms from the production of nitrobenzene by the nitration of benzene.

K100 — Waste Leaching Solution from Acid Leaching of Emission Control Dust/Sludge from Secondary Lead Smelting.

K060 — Ammonia still lime sludge from coking operations.

K061 — Emission control dust/sludge from the primary production of steel in electric furnaces.

K062 — Spent pickle liquor from steel finishing operations in chlorine production.

K069 — Emission control dust/sludge from secondary lead smelting.

K071 — Brine purification muds from the mercury cells process in chlorine production, where separately prepurified brine is not used.

K073 — Chlorinated hydrocarbon waste from the purification step of the diaphragm cell process using graphite anodes.

K083 — Distillation bottoms from aniline production.

K084 — Wastewater treatment sludges generated during the production of veterinary pharmaceuticals from arsenic or organo-arsenic compounds.

K085 — Distillation of fractionation column bottoms from the production of chlorobenzenes.

K086 — Solvent washes and sludges; caustic washes and sludges, or water washes and sludges from cleaning tubs and equipment used in the formulation of ink from pigments, driers, soaps, and stabilizers containing chromium and lead.

K087 — Decanter tank tar sludge from coking operations.

K099 — Untreated wastewater from the production of 2,4-D.

K101 — Distillation tar residues from the distillation of aniline-based compounds in the production of veterinary pharmaceuticals from arsenic or organo-arsenic compounds.

K102 — Residue from the use of activated carbon for decolorization in the production of veterinary pharmaceuticals from arsenic or organo-arsenic compounds.

K103 — Process residues from aniline extraction from the production of aniline.

§261.32 Wastes continued.

K104 — Combined wastewater streams generated from nitrobenzene/aniline production.

K106 — Waste water treatment sludge from the mercury cell process in chlorine production.

§261.33(e) Wastes

P001—Warfarin, when present at concentration greater than 0.3%

P004—Aldrin
P005—Allyl alcohol
P010—Arsenic acid
P011—Arsenic (V) oxide
P012—Arsenic (III) oxide
P015—Beryllium dust
P016—Bis-(chloromethyl)ether
P018—Brucine
P020—Dinoseb
P030—Soluble cyanide salts not elsewhere specified
P036—Dichlorophenylarsine
P037—Dieldrin
P039—Disulfoton
P041—Diethyl-p-nitrophenyl phosphate
P048—2,4 Dinitrophenol
P050—Endosulfan
P058—Fluoroacetic acid sodium salt
P059—Heptachlor
P063—Hydrogen cyanide
P068—Methyl hydrazine
P069—Methyl lactonitrile
P070—Aldicarb
P071—Methyl parathion
P081—Nitroglycerine
P082—N-Nitrosodimethylamine
P084—N-Nitrosomethylvinylamine
P087—Osmium tetroxide
P089—Parathion
P092—Phenylmercuric acetate
P094—Phorate
P097—Famphur
P102—Propargyl alcohol
P105—Sodium azide
P108—Strychnine and salts
P110—Tetraethyl lead
P115—Thallium (I) sulfate
P120—Vanadium pentoxide
P122—Zinc phosphide, when present at concentrations greater than 10%
P123—Toxaphene

§261.33(f) Wastes

U007—Acrylamide
U009—Acrylonitrile
U010—Mitomycin C
U012—Aniline
U016—Benz(c)acridine
U018—Benz(a)anthracene
U019—Benzene
U022—Benzo(a)pyrene
U029—Methyl bromide
U031—n-Butanol
U036—Chlordane, technical
U037—Chlorobenzene
U041—n-Chloro-2,3-epoxypropane
U043—Vinyl chloride
U044—Chloroform
U046—Chloromethyl methyl ether
U050—Chrysene
U051—Creosote
U053—Crotonaldehyde
U061—DDT
U063—Dibenz o (a,b) anthracene
U064—2,2,7,8 Dibenzo pyrene
U066—Dibromo-3-chloropropane 1,2-
U067—Ethylene dibromide
U074—1,4-Dichloro-2-butene
U077—Ethane, 1,2-dichloro-
U078—Dichloroethylene, 1,1-
U086—N,N Diethylhydrazine
U089—Diethylstilbestrol
U103—Dimethyl sulfate
U105—2,4-Dinitrotoluene
U108—Dioxane, 1,4
U115—Ethylene oxide
U122—Formaldehyde
U124—Furan

U129—Lindane
U130—Hexachlorocyclopentadiene
U133—Hydrazine
U134—Hydrofluoric acid
U137—Indeno (1,2,3-cd)pyrene
U151—Mercury
U154—Methanol
U155—Methapyrilene
U157—3-Methylcholanthrene
U158—4,4-Methylene-bis-(2-chloroaniline)
U159—Methyl ethyl ketone
U171—Nitropropane, 2-
U177—N-Nitroso-N-methylurea
U180—N-Nitrosopyrrolidine
U185—Pentachloronitrobenzene
U188—Phenol
U192—Pronamide
U200—Reserpine
U209—Tetrachloroethane, 1,1,2,2
U210—Tetrachloroethylene
U211—Carbon tetrachloride
U219—Thiourea
U220—Toluene
U221—Toluenediamine
U223—Toluene diisocyanate
U226—Methylchloroform
U227—Trichloroethane, 1,1,2-
U228—Trichloroethylene
U237—Uracil mustard
U238—Ethyl carbamate
U248—Warfarin, when present at concentrations of 0.3% or less
U249—Zinc phosphide, when present at concentrations of 10% or less

Subpart C—Prohibitions on Land Disposal.

§ 268.30 Waste specific prohibitions—Solvent wastes.

(a) Effective November 8, 1986, the spent solvent wastes specified in 40 CFR 261.31 as EPA Hazardous Waste Nos. F001, F002, F003, F004, and F005, are prohibited from land disposal (except in an injection well) unless one or more of the following conditions apply:

(1) The generator of the solvent waste is a small quantity generator of 100-1000 kilograms of hazardous waste per month; or

(2) The solvent waste is generated from any response action taken under the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA) or any corrective action taken under the Resource Conservation and Recovery Act (RCRA), except where the waste is contaminated soil or debris not subject to the provisions of this chapter until November 8, 1988; or

(3) The solvent waste is a solvent-water mixture, solvent-containing sludge, or solvent-contaminated soil (non-CERCLA or RCRA corrective action) containing less than 1 percent total F001-F005 solvent constituents listed in Table CCWE of § 268.41 of this part.

(4) The solvent waste is a residue from treating a waste described in paragraphs (a)(1), (a)(2), or (a)(3) of this section; or the solvent waste is a residue from treating a waste not described in paragraphs (a)(1), (a)(2), or (a)(3) of this section provided such residue belongs to a different treatability group than the waste as initially generated and wastes belonging to such a treatability group are described in paragraph (a)(3) of this section.

(b) Effective November 8, 1988, the F001-F005 solvent wastes listed in paragraphs (a)(1), (2), and (3) of this section are prohibited from land disposal. Between November 8, 1986, and November 8, 1988, wastes included in paragraphs (a)(1), (2), and (3) of this section may be disposed of in a landfill or surface impoundment only if the facility is in compliance with the requirements specified in § 268.5(h)(2).

(c) The requirements of paragraphs (a) and (b) of this section do not apply if:

(1) The wastes are treated to meet the standards of Subpart D of this part; or

(2) The wastes are disposed at a facility that has been granted a petition under § 268.6; or

(3) An extension has been granted under § 268.5.

§ 268.32 Waste specific prohibitions—California list wastes.

(a) Effective July 8, 1987, the following hazardous wastes are prohibited from land disposal (except in injection wells):

(1) Liquid hazardous wastes having a pH less than or equal to two (2.0);

(2) Liquid hazardous wastes containing polychlorinated biphenyls (PCBs) at concentrations greater than or equal to 50 ppm;

(3) Liquid hazardous wastes that are primarily water and contain halogenated organic compounds (HOCs) in total concentration greater than or equal to 1,000 mg/l and less than 10,000 mg/l HOCs.

(b)-(c) [Reserved]

(d) The requirements of paragraph (a) of this section do not apply until November 8, 1988 where the wastes are contaminated soil or debris resulting from a response action taken under section 104 or 108 of the Comprehensive Environmental Response, Compensation, and Liability Act or a corrective action required under RCRA Subtitle C.

(e) Effective July 8, 1989, the following hazardous wastes are prohibited from land disposal (subject to any regulations that may be promulgated with respect to disposal in injection wells):

(1) Liquid hazardous wastes that contain HOCs in total concentration greater than or equal to 1,000 mg/l and are not prohibited under paragraph (a)(3) of this section; and

(f) Between July 8, 1987 and July 8, 1989, the wastes described in paragraphs (e)(1) and (e)(2) of this section may be disposed of in a landfill or surface impoundment only if the facility is in compliance with the requirements specified in § 268.5(h)(2).

(g) The requirements of paragraphs (a) and (c) of this section do not apply if:

(1) Persons have been granted an exemption from a prohibition pursuant to a petition under § 268.6, with respect to those wastes and units covered by the petition (except for liquid hazardous wastes containing polychlorinated biphenyls at concentrations greater than or equal to 500 ppm which are not eligible for such exemptions); or

(2) Persons have been granted an extension to the effective date of a prohibition pursuant to § 268.5, with respect to those wastes covered by the extension; or

(3) The wastes meet the applicable standards specified in Subpart D of this part or, where treatment standards are not specified, the wastes are in compliance with the applicable prohibitions set forth in this section or RCRA section 3004(d).

(h) The prohibitions and effective dates specified in paragraphs (a)(3) and (e) of this section do not apply where the waste is subject to a Part 268 Subpart C prohibition and effective date for a specified HOC (such as a hazardous waste chlorinated solvent, see e.g., § 268.03(a)).

(i) To determine whether or not a waste is a liquid under paragraphs (a) and (e) of this section and under RCRA section 3004(d), the following test must be used: Method 9095 (Paint Filter Liquids Test) as described in "Test Methods for Evaluating Solid Wastes. Physical/Chemical Methods," EPA Publication No. SW-846.

(j) Except as otherwise provided in this paragraph, the waste analysis and record-keeping requirements of § 268.7 are applicable to wastes prohibited under this Part or RCRA section 3004(d):

(1) The initial generator of a liquid hazardous waste must test his waste (not an extract or filtrate) in accordance with the procedures specified in § 261.22(a)(1), or use knowledge of the waste, to determine if the waste has a pH less than or equal to two (2.0). If the liquid waste has a pH less than or equal to two (2.0), it is restricted from land disposal and all requirements of Part 268 are applicable, except as otherwise specified in this section.

(2) The initial generator of either a liquid hazardous waste containing polychlorinated biphenyls (PCBs) or a liquid or nonliquid hazardous waste containing halogenated organic compounds (HOCs) must test his waste (not an extract or filtrate), or use knowledge of the waste, to determine whether the concentration levels in the waste equal or exceed the prohibition levels specified in this section. If the concentration of PCBs or HOCs in the waste is greater than or equal to the prohibition levels specified in this section, the waste is restricted from land disposal and all requirements of Part 268 are applicable, except as otherwise specified in this section.

Subpart D—Treatment Standards

§ 268.40 Applicability of treatment standards.

(a) A restricted waste identified in this subpart may be land disposed without further treatment only if an extract of the waste or of the treatment residue of the waste developed using the test method in Appendix I of this part does not exceed the value shown in Table CCWE of § 268.41 for any hazardous constituent listed in the Table CCWE for that waste.

(b) A restricted waste for which a treatment technology is specified under § 268.42(a) may be land disposed after it is treated using that specified technology or an equivalent treatment method approved by the Administrator under the procedures set forth in § 268.42(b).

§ 268.41 Treatment Standards expressed as concentrations in waste extract.

(a) Table CCWE identifies the restricted wastes and the concentrations of their associated hazardous constituents which may not be exceeded by the extract of a waste treatment residual developed using the test method in Appendix I of this part for the allowable land disposal of such waste. (Appendix II of this part provides Agency guidance on treatment methods that have been shown to achieve the Table CCWE levels for the respective wastes. Appendix II is not a regulatory requirement but is provided to assist generators and owners/operators in their selection of appropriate treatment methods.)

TABLE CCWE—CONSTITUENTS IN WASTE EXTRACT

FC01—F005 spent solvents	Concentration (in mg/l)	
	Wasteways containing spent solvents	All other spent solvent wastes
Acetone.....	0.05	0.59
n-Butyl alcohol.....	5.0	5.0
Carbon disulfide.....	1.05	4.81
Carbon tetrachloride.....	.05	.96
Chlorobenzene.....	.15	.05
Cresols (and cresylic acid).....	2.82	.75
Cyclohexanone.....	.125	.75
1,2-dichlorobenzene.....	.65	.125
Ethyl acetate.....	.05	.75
Ethyl benzene.....	.05	.053
Ethyl ether.....	.05	.75
Isobutanol.....	5.0	5.0
Methanol.....	.25	.75
Methylene chloride.....	.20	.96
Methylene chloride (from the pharmaceutical industry).....	12.7	.96
Methyl ethyl ketone.....	0.05	0.75
Methyl isobutyl ketone.....	0.05	0.33
Nitrobenzene.....	0.66	0.125
Pyridine.....	1.12	0.33
Tetrachloroethylene.....	0.079	0.05
Toluene.....	1.12	0.33
1,1,1-Trichloroethane.....	1.05	0.41
1,2,2-Trichloro-1,2,2-trifluoroethane.....	1.05	0.96
Trichloroethylene.....	0.062	0.091
Trichlorofluoromethane.....	0.05	0.96
Xylene.....	0.05	0.15

F020-F023 and F026-F028 dioxin containing wastes	Concentration
HxCDD—All Hexachlorodibenzo-p-dioxins.....	1 ppb
HxCDF—All Hexachlorodibenzofurans.....	1 ppb
PeCDD—All Pentachlorodibenzo-p-dioxins.....	1 ppb
PeCDF—All Pentachlorodibenzofurans.....	1 ppb
TCDD—All Tetrachlorodibenzo-p-dioxins.....	1 ppb
TCDF—All Tetrachlorodibenzofurans.....	1 ppb
2,4,5-Trichlorophenol.....	0.05 ppm
2,4,6-Trichlorophenol.....	0.05 ppm
2,3,4,6-Tetrachlorophenol.....	0.10 ppm
Pentachlorophenol.....	0.01 ppm

(b) when wastes with differing treatment standards for a constituent of concern are combined for purposes of treatment, the treatment residue must meet the lowest treatment standard for the constituent of concern.

§ 268.42 Treatment standards expressed as specified technologies.

(a) The following wastes must be treated using the identified technology or technologies, or an equivalent method approved by the Administrator.

(1) Liquid hazardous wastes containing polychlorinated biphenyls (PCBs) at concentrations greater than or equal to 50 ppm but less than 500 ppm must be incinerated in accordance with the technical requirements of 40 CFR 761.70 or burned in high efficiency boilers in accordance with the technical requirements of 40 CFR 761.60. Liquid hazardous wastes containing polychlorinated biphenyls (PCBs) at concentrations greater than or equal to 500 ppm must be incinerated in accordance with the technical requirements of 40 CFR 761.70. Thermal treatment under this section must also be in compliance with applicable regulations in Parts 264, 265, and 266.

(2) Nonliquid hazardous wastes containing halogenated organic compounds (HOCs) in total concentration greater than or equal to 1,000 mg/kg and liquid HOC-containing wastes that are prohibited under § 268.32(e)(1) of this part must be incinerated in accordance with the requirements of Part 264 Subpart O or Part 265 Subpart O. These treatment standards do not apply where the waste is subject to a Part 268 Subpart C treatment standard for a specific HOC (such as a hazardous waste chlorinated solvent for which a treatment standard is established under § 268.41(a)).

(b) Any person may submit an application to the Administrator demonstrating that an alternative treatment method can achieve a measure of performance equivalent to that achievable by methods specified in paragraph (a) of this section. The applicant must submit information demonstrating that his treatment method is in compliance with federal, state, and local requirements and is protective of human health and the environment. On the basis of such information and any

other available information, the Administrator may approve the use of the alternative treatment method if he finds that the alternative treatment method provides a measure of performance equivalent to that achieved by methods specified in paragraph (a) of this section. Any approval must be stated in writing and may contain such provisions and conditions as the Administrator deems appropriate. The person to whom such approval is issued must comply with all limitations contained in such a determination.

September 23, 1988

CHAPTER EIGHT

EMPLOYEE CERTIFICATION STATEMENT

prepared by

Universal Waste & Transit

Orient Road

Tampa Florida

CERTIFICATION STATEMENT

I hereby certify that I attended the DOT/RCRA Training Course
presented by Universal Waste & Transit.

Certified by:

Date:
