



TEXAS A&M UNIVERSITY
CORPUS CHRISTI

Hazardous Waste Management Program

2018

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TABLE OF CONTENTS

I. INTRODUCTION	2
DETERMINATION OF HAZARDOUS WASTE	2
II. HAZARDOUS WASTE DISPOSAL PROGRAM.....	3
DETERMINATION OF HAZARDOUS WASTE.....	3
III. HAZARDOUS WASTE DISPOSAL REGULATIONS	4
HAZARDOUS WASTE LABELS AND WASTE COLLECTION.....	4
DISPOSING OF EMPTY CHEMICAL CONTAINERS	5
BIOLOGICAL WASTE	6
GLASS WASTE	7
METAL SHARPS.....	7
RADIOACTIVE WASTE	8
IV. GENERAL INFORMATION.....	8
CLASSIFICATION AND SEGREGATION OF HAZARDOUS WASTE.....	8
CONTAINMENT AND STORAGE OF HAZARDOUS WASTE	9
LABELS AND LABELING	10
DISPOSAL.....	10
SOURCE REDUCTION AND HAZARDOUS WASTE MINIMIZATION	11
V. EMERGENCY PROCEDURES.....	11
EMERGENCY PHONE NUMBERS.....	11
APPENDIX A- DEFINITIONS.....	13
APPENDIX B- IDENTIFICATION OF HAZARDOUS WASTE	16
APPENDIX C- SOURCE REDUCTION AND WASTE MANAGEMENT PLAN.....	27

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I. INTRODUCTION

The purpose of this document is to inform the faculty, staff, and students of Texas A&M University - Corpus Christi (TAMU-CC) regarding State and Federal regulations on hazardous waste disposal and to define the TAMU-CC Hazardous Waste Management Program. The Program pertains to hazardous waste and does not include procedures for the management of radioactive, infectious, and/or biological waste. The TAMU-CC Environmental, Health and Safety Department (E,H&S) administers the Hazardous Waste Management Program at TAMU-CC. Compliance with the program is critical and requires full cooperation by all campus entities.

Texas A&M University - Corpus Christi operates as a Conditionally Exempt Small-Quantity Generator (CESQG) of hazardous waste and must comply with the State and Federal regulations on waste disposal associated with that classification. Presently, both the Texas Commission on Environmental Quality (TCEQ) and the Environmental Protection Agency (EPA) inspect the TAMU-CC's Hazardous Waste Management Program for compliance. The University's generator permit is applicable to all Hazardous Waste activities at TAMU-CC.

As a Conditionally Exempt Small-Quantity Generator, the University generates up to 100 kilograms of non-acute hazardous waste per calendar month. A CESQG can store up to 1,000 kilograms of non-acute hazardous waste to transport for disposal at any one time. Storing more than this accumulation limit will require the hazardous waste management under the regulations for a Small Quantity Generator (SQG). A SQG that transports for disposal more than 200 miles away, a 270-day storage period is permitted. This requires that once a chemical is declared as a hazardous waste above the CESQG 1,000Kg storage limit, it must be removed from the campus within 270 days. TAMU-CC is not permitted to treat or dispose of waste locally. All waste must be transported to a permitted off-site Treatment, Storage, and Disposal Facility (TSDF) for further storage, treatment, and/or disposal or recycling. It is illegal to dispose of hazardous waste by dilution, evaporation, or dumping into the sanitary or storm sewers or into the local landfill. The E,H&S personnel collect, transport, and store hazardous waste prior to final disposal. In addition, they provide technical information and assistance to individual generators and maintain permanent records of all hazardous wastes collected on campus.

E,H&S will assist any TAMU-CC Department or System Component in determining and meeting their hazardous waste disposal/recycling needs. Additional information on generator status and specific responsibilities and procedures may be obtained by calling **361-825-5555**.

II. HAZARDOUS WASTE DISPOSAL REGULATIONS

Since Federal and State regulations govern hazardous waste disposal at TAMU-CC, failure to comply with any hazardous waste regulation may result in substantial fines and penalties for the University; individual generators (e.g., principal investigators, employees) causing the violation may be personally liable. Violations may range from failure to properly label a container of hazardous waste to intentionally disposing of hazardous waste into the air, down the drain, or in the garbage.

The Resource Conservation and Recovery Act (RCRA) is administered by the U. S. Environmental Protection Agency (EPA). Under this Act, the EPA has the responsibility for regulating hazardous wastes. RCRA established a "cradle to grave" hazardous waste management requirement to protect public health and the environment from improper disposal of hazardous waste. The law went into effect in 1976.

The Texas Commission on Environmental Quality (TCEQ) administers an equivalent to RCRA for the State of Texas under Industrial Solid Waste and Municipal Hazardous Waste Regulations (Title 30, Part I, Chapter 335).

TAMU-CC has operated as a "Small Quantity Generator" of hazardous waste has an EPA Identification Number and a Texas Solid Waste Registration Number for storing hazardous waste. Before offering hazardous waste for transportation to an off-site facility, all requirements of packaging, labeling, marking and placarding must be met. Many of these are met by the contractor that is hired to perform the final waste pick up, transport, and disposal.

A waste generator never totally loses liability for environmental damage; therefore, the selection of a reliable disposal facility is very important. In Texas, penalties for non-compliance may be civil, criminal, or administrative violations with penalties ranging from fines of up to \$25,000 per day to a 15-year prison term for individuals.

Determination of Hazardous waste

The term "hazardous waste" refers to a discarded or used chemical or material that is either listed as or has the characteristics of hazardous waste. If wastes contain infectious materials or biological hazards, the waste must be treated first as biological waste. Once the biological hazard has been eliminated, then the waste can be treated as hazardous waste. Any waste containing radioactive materials must be treated as radiological waste. A material becomes "waste" when the individual generator determines that it is no longer useful and should be discarded. If the material is to be discarded, E,H&S must determine whether the chemical waste is non-hazardous or hazardous. A material is "non-hazardous waste" if it does not meet the definition of "hazardous waste". A material is "hazardous waste" if it meets one or more of the following:

1. It is a chemical listed on one of the Chemical Tables in (Appendix B).
2. It is a mixture or solution containing a listed (Appendix B) chemical and a non-hazardous chemical.
3. It meets the definition of one of the following:
 - Ignitability (flashpoint <60°C or supports combustion);
 - Reactivity (e.g., responds violently to air or water, cyanides, explosives, unstable chemicals);
 - Corrosivity (pH <4 or >10);
 - Toxicity (e.g., pesticides, heavy metals, poisons);
 - Universal Waste;
 - Materials that are not excluded from regulations.

The E,H&S Department will assist any TAMU-CC Department or System Component in determining and meeting their hazardous waste disposal/recycling needs. Additional information on specific responsibilities and procedures may be obtained by contacting the TAMU-CC E,H&S Department.

III. HAZARDOUS WASTE DISPOSAL PROGRAM

Generators are responsible for following the University disposal procedures, for assuring that their employees are trained in proper disposal procedures, and for properly identifying the hazardous waste generated. The following procedures are intended to assure compliance with applicable Federal and State regulations for the proper management of hazardous waste and to reduce adverse effects to human health and the environment.

Disposal of hazardous waste is governed by the Environmental Protection Agency (EPA) and by the Texas Commission on Environmental Quality (TCEQ) through Federal and State regulations. For more information on hazardous waste disposal regulations and definitions, refer to this program.

Laboratory personnel can ensure compliance with the Hazardous Waste Management Program by following a few simple steps:

1. *Never* dispose of chemicals improperly. Improper disposal includes:
 - Pouring chemicals down the drain;
 - Leaving uncapped chemical containers in the fume hood to evaporate off the chemical; *and*
 - Disposing of chemicals in the regular trash.
2. Collect waste in a leak proof container that is in good condition, that can be securely closed, and that is appropriate for the given chemical.

NOTE: *If a large waste container (>10 gallons) is warranted, contact E,H&S for assistance.*

HAZARDOUS WASTE LABELS AND WASTE COLLECTION

1. When reusing a container to collect chemical waste, completely deface or remove the original label.
2. Label the container:
 - a. The words "Hazardous Waste" must be written on the container or a preprinted Hazardous Waste label must be affixed to the container.
 - b. Identify *ALL* the contents of the waste container on the container itself using the material's full name (No Abbreviations or Chemical Formulas). Example: Nitric Acid, Phenol, or Water.
3. Do *not* mix incompatible waste chemicals in a single container. Use separate waste containers for different waste streams.
4. Do *not* overfill the waste container.
 - a. For liquid hazardous waste:
 - Do not fill jugs and bottles past the shoulder of the container.
 - Fill closed head cans (5 gallons or less), leaving approximately two inches of space between the liquid level and the top of the container.
 - Fill closed head drums (larger than 5 gallons), leaving approximately four inches of space.

- b. For solid hazardous waste materials, do not fill beyond the weight capacity of the container, and leave at least two inches head space for closure.
5. Keep waste containers closed. Waste containers should only be open when adding or removing material.

When the waste container is ready for disposal, it should be labeled as Hazardous Waste. These labels must be filled out using the following the guidelines:

- The Words “**Hazardous Waste**”
- Use **full chemical names** or common names. Chemical formulas or abbreviations are not acceptable.
- List all chemical components, including water.
- Indicate the percent concentration of each compound.

NOTE: Do list all information on a Hazardous Waste label onto the Hazardous Waste Inventory.

The Hazardous Waste Inventory must be email to ehs@tamucc.edu. After the inventory is received, the E,H&S will collect the waste.

NOTE: Some departments have satellite waste disposal areas, where waste containers may be accumulated for pick-up. If waste is taken to a satellite accumulation area, the waste inventory should state the location the waste is being stored. For more information, contact E,H&S.

DISPOSING OF EMPTY CHEMICAL CONTAINERS

Empty chemical containers may be disposed of in the regular trash provided the following EPA requirements are met:

1. Containers must not contain free liquid or solid residue.
2. Containers must be triple rinsed.
3. Product labels must be defaced or removed.
4. Container lids or caps must be removed.
5. Render metal containers and plastic jugs unusable by punching holes in the bottom of the containers before disposing of them in the regular trash. (It is not necessary to break empty glass containers.)

IMPORTANT: Containers that do not meet the requirements mentioned here must be treated as hazardous waste.

Contact E,H&S for more information on hazardous waste disposal procedures and regulations as well as information on waste reduction and minimization.

BIOLOGICAL WASTE

The Texas Department of State Health Services (TDSHS) and the Texas Commission on Environmental Quality (TCEQ) regulate the disposal of biohazardous materials. Biohazardous materials include organisms or substances derived from biological materials or organisms that may be harmful to humans, animals, plants, or the environment. *Biohazardous waste* includes any waste materials that contain biohazardous materials, such as

- Waste (including blood) from *and* bedding or litter used by infectious animals
- Bulk human blood or blood products and waste materials contaminated with human blood
- Microbiological waste (including pathogen-contaminated disposable culture dishes and disposable devices used to transfer, inoculate, and mix pathogenic cultures)
- Biological pathogens
- Sharps
- Any recombinant (rDNA) materials and products of genetic manipulation

IMPORTANT: All biohazardous material must be decontaminated prior to disposal. Biohazardous waste mixed with hazardous chemical or radioactive waste must be managed to eliminate the biohazard prior to disposal. After the waste is no longer biohazardous, it can be managed as either hazardous waste or as radiological waste.

There are strict safety requirements regarding segregation, labeling, packaging, treatment (including documentation), and transportation of biohazardous waste.

The guidelines below should be followed:

1. Do not mix biological waste with chemical waste or other laboratory trash.
2. Segregate hazardous biological waste from nonhazardous biological waste.
3. Clearly label each container of untreated biohazardous waste and mark it with the Biohazard Symbol.
4. It is recommended to label nonhazardous biological waste as "NONHAZARDOUS BIOLOGICAL WASTE."

For information on biological waste treatment methods and disposal requirements, contact the E,H&S Department.

GLASS WASTE

Glassware should never be disposed of in the regular trash. Pasteur pipettes and broken glass can break through trash bags and cut individuals who handle trash. Follow these guidelines when disposing of broken glass:

- Do not pick up broken glass with bare or unprotected hands. Use a brush and dust pan to clean up broken glass. Remove broken glass in sinks by using tongs for large pieces and cotton held by tongs for small pieces and slivers.
- Glass contaminated with biological agents must be decontaminated by thermal or chemical treatment before disposal.
- Glassware contaminated with chemical or radiological materials must also be decontaminated prior to disposal. If decontamination is not possible, the glass should be disposed of as hazardous or radioactive waste.
- Place non-contaminated broken glass in a rigid, puncture resistant container such as a sturdy cardboard box. Mark the box "Non-contaminated Broken Glass." Once the box is three-quarters full, seal it shut. The box should then be placed in the dumpster by laboratory personnel. *Custodial staff are not responsible for disposing of glass waste containers.*

NOTE: If broken glass is commingled with metal sharps, it must be treated as sharps waste and encapsulated before for disposal.

METAL SHARPS

All materials that could cause cuts or punctures, must be contained, encapsulated, and disposed of in a manner that does not endanger other workers. Needles, blades, etc. are considered biohazardous even if they are sterile, capped, and in the original container. The following guidelines apply to handling and disposing of sharps:

- Metal sharps must be segregated from all other waste.
- Sharps that have been used with chemical or biological materials should be decontaminated prior to disposal whenever possible.
- Sharps that have radiological contamination must be disposed of as radiological waste.
- Dispose of sharps in a rigid container, such as a sturdy plastic jar or a metal can.
- When the container is three-quarters full, encapsulate the sharps with Plaster of Paris or some other solidifying medium.
- Once the contents are encapsulated, seal the sharps container, label it "Encapsulated Sharps," and take it to the dumpster.

NOTE: Laboratory personnel are responsible for sharps disposal. Custodial staff are not responsible for encapsulating and/or disposing of metal sharps waste.

RADIOACTIVE WASTE

Radioactive materials, depending upon the license, are regulated by the State of Texas or the Nuclear Regulatory Commission, and these regulations/rules are enforced by E,H&S's Radiological Safety Program. All radioactive wastes shall be disposed through E,H&S or via written procedures approved by E,H&S. Contact E,H&S for more information on proper disposal of radiological waste.

IV. GENERAL INFORMATION

1. Non-hazardous waste may be disposed of using the sanitary sewer or regular trash. Additional information about non-hazardous waste disposal can be obtained from E,H&S.
2. Hazardous chemicals can be treated to reduce the hazard or the quantity of waste in the laboratory if the treatment procedure is included in the experimental protocol.
3. Gas cylinders should be returned to the manufacturer or distributor whenever possible. Non-returnable cylinders should be labeled as hazardous waste.
4. Photographic lab waste containing **silver** must be disposed as hazardous waste. However, some new developing equipment includes a filtration system that removes the **silver**. Photographic lab effluent that does not contain silver may be discarded through the sanitary sewer system. **Please notify E,H&S if you have this type of equipment.**
5. "Mixed Waste" (includes both radioactive material and hazardous chemicals) should be initially routed through the E,H&S Radiation Safety Officer.
6. Chemical waste that is "unknown" will be picked up by E,H&S. Place a waste disposal label on the container using "unknown" for the chemical description. Generators will be charged for the cost of analysis necessary to determine the chemical identity for proper disposal.

Classification and Segregation of Hazardous Waste

1. Hazardous waste is categorized into the following hazard groups.
 - A. Halogenated solvents
 - B. Non-halogenated solvents
 - C. Acids (inorganic or organic)
 - D. Bases (inorganic or organic)
 - E. Heavy metals (silver, cadmium, lead, mercury, etc.)
 - F. Poisons (inorganic or organic)
 - G. Reactives (cyanides, sulfides, water reactive chemicals, peroxides, etc.)
 - H. Ignitable (fuels, solvents)
2. Different types of hazardous waste must not to be commingled in the same waste container.
3. Do not combine inorganic heavy metal compounds and organic waste solvents.
4. Do not combine non-hazardous waste (e.g., mixture of water, dilute acetic acid, and sodium bicarbonate) with hazardous waste.

5. Dry materials (paper, rags, towels, gloves, or Kim Wipes, etc.) contaminated with flammable or extremely toxic chemicals must be double-bagged in heavy-duty plastic bags and must be treated as hazardous waste. **Do not use biohazard bags.**
6. Sharps (needles, razor blades, etc.) are classified as bio-hazardous waste even if they are not contaminated. Sharps must be encapsulated (Place the sharps in a "puncture resistant" container or plastic/metal container and then fill it with paraffin or plaster of Paris.). Discard the containers of sharps as bio-hazardous waste. *Contact E,H&S for additional information.*

Containment and Storage of Hazardous Waste

1. Waste generators must maintain custody and control of the storage areas and ensure the waste is accessible to E,H&S personnel.
2. Individual waste generators shall assure that their hazardous wastes are accumulated in safe, transportable containers, properly labeled, and stored to prevent human exposure to or environmental release of the waste materials.
3. Incompatible wastes and materials must be stored separately to prevent mixing of these substances.
4. Waste generators shall provide their own waste containers that are compatible with the chemical contents (e.g., do not use metal containers for corrosive waste or plastic containers for organic solvent). Containers must be in good condition and not leak. All containers must have suitable screw caps or other means of secure closure. When large waste containers (>10 gallons, total volume) are required, contact E,H&S for assistance on selection and placement of appropriate container type and size.
5. Never overfill hazardous waste containers. Expansion and excess weight can lead to spills, explosions, and **extensive environmental exposure**.
 - Containers of solids must not be filled beyond their weight and volume capacity.
 - Jugs and bottles should not be filled above the shoulder of the container.
 - Closed head cans (5 gallons or less) should have at least two inches of headspace between the liquid level and the head of the container.
 - Closed head drums (larger than 5 gallons) should have at least four inches of headspace.
6. Containers must be closed or sealed to prevent leakage. All waste collection containers must be kept closed except when adding or removing material.
7. **In addition to the above, Satellite Accumulation Areas must ensure:**
 - The area is secured from "Unauthorized Entry" and emergency contacts are posted.
 - Waste is stored in a designated and marked area.
 - These areas must be accessible to E,H&S personnel.
 - Hazardous waste is separated from non-waste chemicals.

- That less than 55 gallons of anyone hazard class of waste or one quart of acutely hazardous waste is being stored.
- Spill Control Equipment is available.

Labels and Labeling

1. The original chemical label on containers used for waste accumulation must be destroyed or defaced.
2. EPA regulations require that waste containers be labeled with the chemical contents and the words "Hazardous Waste" **when the chemical waste is first added.**
 - A preprinted Hazardous Waste label, having an adhesive back, can be used and are available from E,H&S. Labels must be placed on the container when the chemical is first added. **Print the information on the label legibly.**

Disposal

1. It is illegal to dispose of hazardous chemicals in any of the following ways:
 - Disposal through the sanitary drain.
 - Intentional evaporation in a fume hood.
 - Disposal in the regular trash.
2. Empty containers should be placed in a dumpster for disposal with other non-hazardous trash when the following requirements are satisfied. EPA regulations stipulate that **an empty chemical container** must:
 - not contain free liquid or solid residue,
 - be triple rinsed,
 - have the label removed or defaced,
 - have the lid or cap removed, and
 - have a hole punched in the bottom (metal or plastic containers).

It is not necessary to break empty glass containers when placed in a dumpster. Empty chemical containers not handled in this manner must be treated as hazardous waste (very expensive).

- *** Chemical name/Common name Only. Chemical formulas or abbreviations are not acceptable.
- *** List all chemical components in a waste container (including water).
- *** Labels for containers of potentially explosive materials such as picric acid, silanes, nitro compounds, and ethers must indicate the percent concentration of these chemicals.

Place any additional Hazard Information about container contents in the inventory.

Source Reduction and Hazardous Waste Minimization

Hazardous waste regulations have evolved from emphasis on reduction to the prevention of environmental pollution. The Pollution Prevention Act of 1990 (Federal Regulation) made the prevention of pollution and reduction of waste generation a national priority. The Texas Waste Reduction Policy Act (Senate Bill 1099 of 1991) required Texas A&M University System to prepare and implement a Source Reduction and Waste Minimization Plan. The Plan was developed and is coordinated by the TAMU-CC Environmental, Health & Safety Department. The key to the Plan is "front-end minimization". Front-end minimization means reducing hazardous waste by reducing the quantities of hazardous chemicals used and by substituting less hazardous materials. Research and teaching laboratories and other working groups (Facilities Services, etc.) that generate hazardous waste should review their purchasing practices and systems, chemical usage patterns, and workplace activities to identify potential points of their operations where source reduction and waste minimization can be implemented.

V. EMERGENCY PROCEDURES

TAMU-CC Hazard Communication Program requires that TAMU-CC employees be informed of hazardous materials that they might use or be exposed to at work. In addition, the program should include training on handling spills and other emergencies. Safety Data Sheets are a source of this information and should be maintained for all chemicals used or stored within a workplace. Special cleanup supplies should be available and employees should be trained on how to use these supplies. The TAMU-CC Environmental, Health & Safety Department can provide additional information on handling specific chemical spills and is equipped and trained to assist with hazardous chemical spills. Contaminated clothing, rags, absorbent materials, or other waste from cleanup of spills or leaks must be properly disposed of. All labs should post emergency numbers to be used and develop a response scenario for emergencies.

Emergency telephone numbers of importance are listed below:

Campus Phone Emergency Number	911
TAMU-CC Police Department	825-4444
TAMU-CC Environmental Health & Safety Office	825-5555
TAMU-CC National Spill Control School	825-3333
University Health Center	825-2601
Facilities Service	825-2324
Poison Control Center	1-800-222-1222

APPENDIX A

Definitions

Central Accumulation Area

Site designated by the Environmental Health & Safety Department to be used for the storage of hazardous wastes prior to shipment to permitted disposal facilities.

Disposal

The discharge, deposit, injection, dumping, spilling, or placing of any solid waste or hazardous waste (whether containerized or non-containerized) into or on any land or water so that such solid waste or any constituent thereof may enter the environment or be emitted into the air or discharged into any water, including ground waters.

EPA Identification Number

The number assigned by the Environmental Protection Agency to each generator, transporter, and processing, storage or disposal facility.

Facility

Includes all contiguous land, and structures, other appurtenances, and improvements on the land used for storing, processing, or disposing of municipal hazardous waste or industrial solid waste.

Generator

Any *person*, by site, who produces municipal hazardous waste or industrial solid waste; any person who possesses municipal hazardous waste or industrial solid waste to be shipped to any other person; or any person whose act first causes the solid waste to become subject to regulation. *Person* refers to an individual, trust, firm, corporation, Federal Agency, State, political subdivision of a State, municipality, or any interstate body.

Hazardous Material

A substance or material, including a hazardous substance, which has been determined by the Secretary of Transportation to be capable of posing an unreasonable risk to health, safety, and property when transported in commerce, and which has been so designated.

Hazardous Waste

Any solid waste material listed or identified in Title 40 Code of Federal Regulations, Part 261, Subpart C and D or exhibiting the characteristics of ignitability, corrosivity, reactivity, or E.P. toxicity also defined in Part 261. Tables containing the listing and characteristics of hazardous wastes are shown in Appendix B.

Manifest

A legal document containing required information, which must accompany shipments of Municipal Hazardous Waste or Class I-Industrial Solid Waste transported on public roads or thoroughfares.

Mixed Waste

A radioactive waste that is also a hazardous waste.

Permit

A written document issued by EPA or TCEQ that, by its conditions, authorizes the construction, installation, modification, or operation of a specified municipal hazardous waste or industrial solid waste storage, processing, or disposal facility in accordance with specified limitations.

Processing

The extraction of materials, transfer, volume reduction, conversion to energy, or other separation and preparation of solid waste for reuse or disposal, including the treatment or neutralization of hazardous waste, designed to change the physical, chemical, or biological character or composition of any hazardous waste so as to neutralize such waste, or as to recover energy or material from the waste or so as to render such waste non-hazardous or less hazardous; safer to transport, store, and dispose; or amenable for recovery, amenable for storage, or reduced in volume.

Recyclable Materials

Wastes that are recycled. Recycled material is used, reused, or reclaimed.

Reclaimed material

Is processed or regenerated to recover a usable product. Examples: Recovery of lead from spent batteries, or regeneration of spent solvent.

Satellite Accumulation Area

An area, system, or structure used for temporary accumulation of hazardous waste prior to transport to the central accumulation area.

Solid Waste

Any garbage, refuse, sludge from a waste treatment plant, water treatment plant, or air pollution control facility or other discarded material, including solid, liquid, semi-solid, or contained gaseous material resulting from industrial, municipal, commercial, mining and agricultural operations, and from community and institutional activities.

Storage

The holding of solid waste for a temporary period, at the end of which the waste is processed, disposed of, recycled, or stored elsewhere.

Texas Solid Waste Number

The number assigned by the TCEQ to each generator, transporter, and processing, storage, or disposal facility.

Transporter

Any person who conveys or transports municipal hazardous waste or industrial solid waste by truck, ship, pipeline or other means.

Universal Waste

Any hazardous waste subject to 40 CFR Part 273 and TAC335.261 to include:

- a. Batteries including lead-acid that are not managed under 40 CFR 266, Subpart G;
- b. Recalled pesticides that are part of a voluntary or mandatory recall under FIFRA or pesticides managed as part of a waste pesticide program; and
- c. Mercury Thermostats that are not hazardous using 40 CFR 261, Subpart C.

Waste

Any material for which there is no use and is to be discarded as valueless.

APPENDIX B

Identification of Hazardous Waste

40 CFR 261.21 Characteristic of ignitability

- (a) A solid waste exhibits the characteristic of ignitability if a representative sample of the waste has any of the following properties:
 - (1) It is a liquid, other than an aqueous solution containing less than 24 percent alcohol by volume and has flash point less than 60C (140F), as determined by a Pensky-Martens Closed Cup Tester, using the test method specified in ASTM Standard D-93-79 or D-93-80 (incorporated by reference, see 40 CFR 260.11), or a Setaflash Closed Cup Tester, using the test method specified in ASTM Standard D-3278-78 (incorporated by reference, see 40 CFR 260.11), or as determined by an equivalent test method approved by the Administrator under procedures set forth in 40 CFR 260.20 and 40 CFR 260.21.
 - (2) It is not a liquid and is capable, under standard temperature and pressure, of causing fire through friction, absorption of moisture or spontaneous chemical changes and, when ignited, burns so vigorously and persistently that it creates a hazard.
 - (3) It is an ignitable compressed gas as defined in 49 CFR 173.300 and as determined by the test methods described in that regulation or equivalent test methods approved by the Administrator under 40 CFR 260.20 and 40 CFR 260.21.
 - (4) It is an oxidizer as defined in 49 CFR 173.151.
- (b) A solid waste that exhibits the characteristic of ignitability has the EPA Hazardous Waste Number of D001.

261.22 Characteristic of corrosivity

- (a) A solid waste exhibits the characteristic of corrosivity if a representative sample of the waste has either of the following properties:
 - (1) It is aqueous and has a pH less than or equal to 2 or greater than or equal to 12.5, as determined by a pH meter using either an EPA test method or an equivalent test method approved by the Administrator under the procedures set forth in 40 CFR 260.20 and 40 CFR 260.21. The EPA test method for pH is specified as Method 5.2 in "Test Methods for the Evaluation of Solid Waste, Physical/Chemical Methods" (incorporated by reference, see 40 CFR 260.11).

- (2) It is a liquid and corrodes steel (SAE 1020) at a rate greater than 6.35 mm (0.250 inch) per year at a test temperature of 55C (130F) as determined by the test method specified in NACE (National Association of Corrosion Engineers) Standard TM-01-69 as standardized in "Test Methods for the Evaluation of Solid Waste, Physical/Chemical Methods" (incorporated by reference, see 40 CFR 260.11) or an equivalent test method approved by the Administrator under the procedures set forth in 40 CFR 260.20 and 40 CFR 260.21.
- (b) A solid waste that exhibits the characteristic of corrosivity has the EPA Hazardous Waste Number of D002.

261.23 Characteristic of reactivity.

- (a) A solid waste exhibits the characteristic of reactivity if a representative sample of the waste has any of the following properties:
- (1) It is normally unstable and readily undergoes violent change without detonating.
 - (2) It reacts violently with water.
 - (3) It forms potentially explosive mixtures with water.
 - (4) When mixed with water, it generates toxic gases, vapors or fumes in a quantity sufficient to present a danger to human health or the environment.
 - (5) It is a cyanide or sulfide bearing waste which, when exposed to pH conditions between 2 and 12.5, can generate toxic gases, vapors or fumes in a quantity sufficient to present a danger to human health or the environment.
 - (6) It is capable of detonation or explosive reaction if it is subjected to a strong initiating source or if heated under confinement.
 - (7) It is readily capable of detonation or explosive decomposition or reaction at standard temperature and pressure.
 - (8) It is a forbidden explosive as defined in 49 CFR 173.51, or a Class A explosive as defined in 49 CFR 173.53 or a Class B explosive as defined in 49 CFR 173.88.
- (b) A solid waste that exhibits the characteristic of reactivity has the EPA Hazardous Waste Number of D003.

261.24 Toxicity characteristic.

- (a) A solid waste exhibits the characteristic of toxicity if the extract from a representative sample of the waste contains any of the contaminants listed in Table I at a concentration equal to or greater than the respective value given in that Table. Where the waste contains less than 0.5 percent filterable solids, the waste itself is considered to be the extract for the purpose of this section.

- (b) A solid waste that exhibits the characteristic of toxicity has the EPA Hazardous Waste Number specified in Table I which corresponds to the toxic contaminant causing it to be hazardous.

Table I - Maximum Concentration of Contaminants for the Toxicity Characteristic

EPA Contaminant/CAS Regulatory Number	D034 Hexachloroethane 67-72-1
D004 Arsenic 7440-38-2	D008 Lead 7439-92-1
D005 Barium 7440-39-3	D013 Lindane 58-89-9
D018 Benzene 71-43-2	D009 Mercury 7439-97-6
D006 Cadmium 7440-43-9	D014 Methoxychlor 72-43-5
D019 Carbon tetrachloride 6-23-5	D035 Methyl ethyl ketone 78-93-3
D020 Chlordane 57-74-9	D036 Nitrobenzene 98-95-3
D021 Chlorobenzene 08-90-7	D037 Pentachlorophenol 87-86-5
D022 Chloroform 67-66-3	D038 Pyridine 110-86-1 [3]
D007 Chromium 7440-47-3	D010 Selenium 7782-49-2
D023 o-Cresol 95-48-7	D011 Silver 7440-22-4
D024 m-Cresol 108-39-4	D039 Tetrachloroethylene 127-18-4
D025 p-Cresol 106-44-5	D015 Toxaphene 8001-35-2
D026 Cresol ----- [4]	D040 Trichloroethylene 79-01-6
D016 2,4-D 94-75-7	D041 2,4,5-Trichloro-phenol 95-95-4
D027 1,4-Dichlorobenzene 106-46-7	D042 2,4,6-Trichloro-phenol 88-06-2
D028 1,2-Dichloroethane 107-06-2	D017 2,4,5-TP (Silvex) 93-72-1
D029 1,1-Dichloroethylene 75-35-4	D043 Vinyl chloride 75-01-4
D030 2,4-Dinitrotoluene 121-14-2 [3]	
D012 Endrin 72-20-8	
D031 Heptachlor 76-44-8	
D032 Hexachlorobenzene 118-74-1 [3]	
EPA Contaminant CAS Regulatory Number	
D033 Hexachlorobutadiene 87-68-3	

[1] Hazardous waste number.

[2] Chemical abstracts service number.

[3] Quantitation limit is greater than the calculated regulatory level. The quantitation limit therefore becomes the regulatory level.

[4] If o-, m-, and p-Cresol concentrations cannot be differentiated, the total cresol (D026) concentration is used. The regulatory level of total cresol is 200 mg/l.

40 CFR 261.33 Discarded commercial chemical products, off-specification species, container residues, and spill residues thereof.

The following materials or items are hazardous wastes if and when they are discarded or intended to be discarded as described in 40 CFR 261.2(a)(2)(i), when they are mixed with waste oil or used oil or other material and applied to the land for dust suppression or road treatment, when they are otherwise applied to the land in lieu of their original intended use or when they are contained in products that are applied to the land in lieu of their original intended use, they are produced for use as (or as a component of) a fuel, distributed for use as a fuel, or burned as a fuel.

- (a) Any commercial chemical product or manufacturing chemical intermediate having the generic name listed in paragraph (e) or (f) of this section.
- (b) Any off-specification commercial chemical or manufacturing chemical intermediate which, if it met specifications, would have the generic name listed in paragraph (e) or (f) of this section.
- (c) Any residue remaining in a container or in an inner liner removed from a container that has held any commercial chemical product or manufacturing chemical intermediate having the generic name listed in paragraphs (e) or (f) of this section, unless the container is empty as defined in 40 CFR 261.7(b) of this chapter. [*Comment: Unless the residue is being beneficially used or reused, or legitimately recycled or reclaimed; or being accumulated, stored, transported or treated prior to such use, re-use, recycling or reclamation, EPA considers the residue to be intended for discard, and thus a hazardous waste. An example of a legitimate re-use of the residue would be where the residue remains in the container and the container is used to hold the same commercial chemical product or manufacturing chemical intermediate it previously held. An example of the discard of the residue would be where the drum is sent to a drum reconditioner who reconditions the drum but discards the residue.*]
- (d) Any residue or contaminated soil, water or other debris resulting from the cleanup of a spill into or on any land or water of any commercial chemical product or manufacturing chemical intermediate having the generic name listed in paragraph (e) or (f) of this section, or any residue or contaminated soil, water or other debris resulting from the cleanup off a spill, into on any land or water, of any off-specification commercial chemical product or manufacturing chemical intermediate having the generic name listed in listed in paragraph (e) or (f) of this section. [*Comment: The phrase "commercial chemical product or manufacturing chemical intermediate having the generic name listed in ..." refers to a chemical substance which is manufactured or formulated for commercial or manufacturing use which consists of the commercially pure grade of the chemical, any technical grades of the chemical*

that are produced or marketed, and all formulations in which the chemical is the sole active ingredient. It does not refer to a material, such as a manufacturing process waste, that contains any of the substances listed in paragraph (e) or (f). Where a manufacturing process waste is deemed to be a hazardous waste because it contains a substance listed in paragraph (e) or (f), such waste will be listed in either 40 CFR 261.31 or 40 CFR 261.32 or will be identified as a hazardous waste by the characteristics set forth in Subpart C of this part]

- (e) The commercial chemical products, manufacturing chemical intermediate off-specification commercial chemical product or manufacturing chemical intermediates referred to in paragraphs (a) through (d) of this section, are identified as acute hazardous wastes (H) and are subject to be the small quantity exclusion defined in 40 CFR 261.5(e). [*Comment: For the convenience of the regulated community the primary hazardous properties of these materials have been indicated by the letters T (Toxicity), and R (Reactivity). Absence of a letter indicates that the compound only is listed for acute toxicity]*]

Hazardous Chemical Substance
Waste Abstracts No.

P023 107-20-0 Acetaldehyde, chloro	P024 106-47-8 Benzenamine, 4-chloro-
P002 591-08-2 Acetamide, N-(amino thioxomethyl)-	P077 100-01-6 Benzenamine, 4-nitro-
P057 640-19-7 Acetamide, 2-fluoro	P028 100-44-7 Benzene, (chloromethyl)-
P058 62-74-8 Acetic acid, fluoro,sodium salt	P042 51-43-4 1,2-Benzenediol, -[1-hydroxy-2-(methylamino)ethyl]-, (R)-
P002 591-08-2 1-Acetyl-2-thiourea	P046 122-09-8 Benzeneethanamine, alpha, alpha-dimethyl- 14
P003 107-02-8 Acrolein	P014 108-98-5 Benzenethiol
P070 116-06-2 Aldicarb	P001 [1]81-81-2 2H-1-Benzopyran-2-one, 4-hyd-roxy-3-(3-oxo-1-phenylbutyl)-and salts when present at concentrations greater than 0.3%
P004 309-00-2 Aldrin	P028 100-44-7 Benzyl chloride
P005 107-18-6 Allyl alcohol	P015 7440-41-7 Beryllium
P006 20859-73-8 Aluminum phosphide R,T	P017 598-31-2 Bromoacetone
P007 2763-96-4 5-(Aminomethyl)-3-isoxazolol	P018 357-57-3 Brucine
P008 504-24-5 4-Aminopyridine	P045 39196-18-4 2-Butanone, 3,3-dimethyl-1-(methylthio)-, O-[methylamino] carbonyl] oxime
P009 131-74-8 Ammonium picrate (R)	P021 592-01-8 Calcium cyanide
P119 7803-55-6 Ammonium vanadate	P021 592-01-8 Calcium cyanide Ca(CN)(2)
P099 506-61-6 Argentate(1-), bis(cyano-C)-, potassium	P022 75-15-0 Carbon disulfide
P010 7778-39-4 Arsenic Acid H(3)AsO(4)	P095 75-44-5 Carbonic dichloride
P012 1327-53-3 Arsenic oxide As(2)O(3)	P023 107-20-0 Chloroacetaldehyde
P011 1303-28-2 Arsenic oxide As(2)O(5)	P024 106-47-8 p-Chloroaniline
P011 1303-28-2 Arsenic pentoxide	P026 5344-82-1 1-(o-Chlorophenyl)thiourea
P012 1327-53-3 Arsenic trioxide	P027 542-76-7 3-Chloropropionitrile
P038 692-42-2 Arsine, diethyl-	P029 544-92-3 Copper cyanide
P036 696-28-6 Arsonous dichloride, phenyl-	P029 544-92-3 Copper cyanide Cu(CN)2
P054 151-56-4 Aziridine	P030 Cyanides (soluble cyanide salts), not otherwise specified
P067 75-55-8 Aziridine, 2-methyl-	P031 460-19-5 Cyanogen
P013 542-62-1 Barium cyanide	P033 506-77-4 Cyanogen chloride

P033 506-77-4 Cyanogen chloride (CN)Cl	P049 541-53-7 Dithiobiuret
P034 131-89-5 2-Cyclohexyl-4,6-dinitro phenol	P050 115-29-7 Endosulfan
P016 542-88-1 Dichloromethyl ether	P088 145-73-3 Endothall
P036 696-28-6 Dichlorophenylarsine	P051 72-20-8 Endrin
P037 60-57-1 Dieldrin	P051 72-20-8 Endrin, & metabolites
P038 692-42-2 Diethylarsine	P042 51-43-4 Epinephrine
P041 311-45-5 Diethyl-p-nitrophenylphosphate	P031 460-19-5 Ethanedinitrile
P040 297-97-2 O,O-Diethyl O-pyrazinyl phosphorothioate	P066 16752-77-5 Ethanimidothioic acid, N [[(methylamino)carbonyl]oxy]-, methyl ester
P043 55-91-4 Diisopropylfluorophosphate (DFP)	P101 107-12-0 Ethyl cyanide
P004 309-00-2 1,4,5,8-Dimethanonaphthalene, 1,2,3,4,10,10-hexachloro-1,4,4a, 5,8,8a-hexahydro-, (1alpha,4alpha, 4abeta,5alpha, 8alpha, 8abeta)-	P054 151-56-4 Ethyleneimine
P060 465-73-6 1,4,5,8-Dimethanonaphthalene,1,2, 3,4,10,10-hexachloro-1,4,4a,5,8,8 a -hexahydro-, (1alpha,4alpha,4 abeta,5beta,8beta,8abeta)-	P097 52-85-7 Famphur
P037 60-57-1 2,7:3,6-Dimethanonaphth[2,3b] oxirane, 3,4,5,6,9,9-hexachloro- 1a,2,2a,3,6,6a,7,7a-octahydro-, (1aalpha,2beta,2aalpha,3beta, 6beta,6aalpha,7beta,7aalpha)-	P056 7782-41-4 Fluorine
P051 72-20-5 2,7:3,6-Dimethanonaphth[2,3b] (1aalpha,2beta,2abeta,3alpha, 6alpha,6abeta,7beta,7aalpha)-, & metabolites	P057 640-19-7 Fluoroacetamide
P044 60-51-5 Dimethoate	P058 62-74-8 Fluoroacetic acid, sodium salt
P046 122-09-8 alpha, alpha-Dimethylphene thylamine	P065 628-86-4 Fluminic acid, mercury(2+) salt (R,T)
P047 [1]534-52-1 4,6-Dinitro-o-cresol, salts	P059 76-44-8 Heptachlor
P048 51-28-5 2,4-Dinitrophenol	P062 757-58-4 Hexaethyl tetraphosphate
P020 88-85-7 Dinoseb	P116 79-19-6 Hydrazinecarbothioamide
P085 152-16-9 Diphosphoramidate, octamethyl-	P068 80-34-4 Hydrazine, methyl-
P111 107-49-3 Diphosphoric acid, tetraethylester	P063 74-90-8 Hydrocyanic acid
P039 298-04-4 Disulfoton	P063 74-90-8 Hydrogen cyanide
	P096 7803-51-2 Hydrogen phosphide
	P060 465-73-6 Isodrin
	P007 2763-96-4 3(2H)-Isoxazolone, 5- (aminomethyl)-
	P092 62-38-4 Mercury, (acetato-O)phenyl
	P065 628-86-4 Mercury fulminate (R,T)
	P082 62-75-9 Methanamine, N-methyl -N-nitroso-

P064 624-83-9 Methane, isocyanato-	P085 152-16-9 Octamethylpyrophosphoramidate
P016 542-88-1 Methane, oxybis[chloro-	P087 20816-12-0 Osmium oxide OsO(4), (T-4)-
P112 509-14-8 Methane, tetranitro- (R)	P087 20816-12-0 Osmium tetroxide
P118 75-70-7 Methanethiol, trichloro- 15	P088 145-73-3 7-Oxabicyclo[2.2.1]heptane-2,3-dicarboxylic acid
P050 115-29-7 6,9-Methano-2,4,3-benzodioxathiepin, 6,7,8,9,10,10 -hexachloro-1,5,5a,6,9,9a- hexahydro-, 3-oxide	P089 56-38-2 Parathion
P059 76-44-8 4,7-Methano-1H-indene,1,4,5,6,7,8,8-heptachloro-3a,4,7,7a-tetrahydro	P034 131-89-5 Phenol, 2-cyclohexyl-4,6-dinitro-
P066 16752-77-5 Methomyl	P048 51-28-5 Phenol, 2,4-dinitro-
P068 60-34-4 Methyl hydrazine	P047 [1]534-52-1 Phenol, 2-methyl-4,6-dinitro- and salts
P064 624-83-9 Methyl isocyanate	P020 88-85-7 Phenol, 2-(1-methylpropyl) -4,6-dinitro-
P069 75-86-5 2-Methylactonitrile	P009 131-74-8 Phenol, 2,4,6-trinitro-, ammonium salt (R)
P071 298-00-0 Methyl parathion	P092 62-38-4 Phenylmercury acetate
P072 86-88-4 alpha-Naphthylthiourea	P093 103-85-5 Phenylthiourea
P073 13463-39-3 Nickel carbonyl	P094 298-02-2 Phorate
P073 13463-39-3 Nickel carbonyl Ni(CO)(4), (T-4)-	P095 75-44-5 Phosgene
P074 557-19-7 Nickel cyanide	P096 7803-51-2 Phosphine
P074 557-19-7 Nickel cyanide Ni(CN)(2)	P041 311-45-5 Phosphoric acid, diethyl 4-nitro phenyl ester
P075 [1]54-11-5 Nicotine and salts	P039 298-04-4 Phosphorodithioic acid, O,O-diethyl S-[2-(ethylthio)ethyl]ester
P076 10102-43-9 Nitric oxide	P094 296-04-2 Phosphorodithioic acid, O,O-diethyl S-[(ethylthio)methyl] ester
P077 100-01-6 p-Nitroaniline	P044 60-51-5 Phosphorodithioic acid, O,O-dimethyl -[2-(methylamino)- 2-oxoethyl]
P078 10102-44-0 Nitrogen dioxide	P043 55-91-4 Phosphorofluoridic acid, bis-(1-methylethyl) ester
P076 10102-43-9 Nitrogen oxide NO	P089 56-38-2 Phosphorothioic acid, O,O-diethyl
P078 10102-44-0 Nitrogen oxide NO(2)	P040 297-92-2 Phosphorodithioic acid, O,O-diethyl O-pyrazinyl ester
P081 55-63-0 Nitroglycerine (R)	P097 52-85-7 Phosphorodithioic acid, O-O,4[[di(methylamino)sulfonyl]phenyl]O,O-dimethyl ester
P082 62-75-9 N-Nitrosomethylamine	
P084 4549-40-0 N-Nitrosomethylvinylamine	

P071 296-00-0 Phosphorodithioic acid, O,O-dimethyl O-(4-nitrophenyl)ester	P108 [1]57-24-9 Strychnidin-10-one, and salts
P110 78-00-2 Plumbane, tetraethyl-	P018 357-57-3 Strychnidin-10-one, 2,3- dimethoxy-
P098 151-50-8 Potassium cyanide	P108 [1]57-24-9 Strychnine, and salts
P098 151-50-8 Potassium cyanide K(CN)	P115 7446-18-6 Sulfuric acid, ithallium salts
P099 506-61-6 Potassium silver cyanide	P109 3689-24-5 Tetraethyldithiopyrophosphate
P070 116-06-3 Propanal, 2-methyl-2-(methylthio)- O-[(methylamino)carbonyl]oxime	P110 78-00-2 Tetraethyl lead
P101 107-12-0 Propanenitrile	P111 107-49-3 Tetraethyl pyrophosphate
P027 542-76-7 Propanenitrile,3-chloro-	P112 509-14-8 Tetranitromethane (R)
P069 75-86-5 Propanenitrile, 2-hydroxy -2-methyl-	P062 757-58-4 Tetrphosphoric acid, hexaethyl ester
P081 55-63-0 1,2,3-Propanetriol, trinitrate (R)	P113 1314-32-5 Thallic oxide
P017 598-31-2 2-Propanone, 1-bromo-	P113 1314-32-5 Thallium oxide Tl(2)O(3)
P102 107-19-7 Propargyl alcohol	P114 12039-52-0 Thallium(I) selenite
P003 107-02-8 2-Propenal	P115 7446-18-6 Thallium(I) sulfate
P005 107-18-6 2-Propen-1-ol	P109 3689-24-5 Thiodiphosphoric acid, tetraethyl ester
P067 75-55-8 1,2-Propylenimine	P045 39196-18-4 Thiofanox
P102 107-19-7 2-Propyn-1-ol	P049 541-53-7 Thiomidodicarbonic diamide (H(2)N)C(S)](2)NH
P008 504-24-5 4-Pyridinamine	P014 108-98-5 Thiophenol
P075 [1]54-11-5 Pyridine, 3-(1-methyl-2-pyrrolidinyl)-,(S)-, and salts	P116 79-19-6 Thiosemicarbazide
P114 12039-52-0 Selenious acid, dithallium(1+) salt	P026 5344-82-1 Thiourea, (2-chlorophenyl)-
P103 630-10-4 Selenourea	P072 86-88-4 Thiourea, 1-naphthalenyl-
P104 506-64-9 Silver cyanide	P093 103-85-5 Thiourea, phenyl-
P104 506-64-9 Silver cyanide Ag(CN)	P123 8001-35-2 Toxaphene
P105 26628-22-8 Sodium azide	P118 75-70-7 Trichloromethanethiol
P106 143-33-9 Sodium cyanide	P119 7803-55-6 Vanadic acid, ammonium salt
P106 143-33-9 Sodium cyanide Na(CN)	P120 1314-62-1 Vanadium oxide V(2)O(5)
	P120 1314-62-1 Vanadium pentoxide

P084 4549-40-0 Vinylamine, N-methyl-N-nitroso

P001 [1]81-81-2 Warfarin, & salts, when present at concentrations greater than 0.3% P121 557-21-1 Zinc cyanide

P121 557-21-1 Zinc cyanide Zn(CN)(2)

P122 1314-84-7 Zinc phosphide Zn(3)P(2), when than 10% (R,T)

[1] CAS Number given for parent compound only.

(f) The commercial chemical products, manufacturing chemical intermediates, or off-specification commercial chemical products referred to in paragraphs (a) through (d) of this section, are identified as toxic wastes (T), unless otherwise designated and are subject to the small quantity generator exclusion defined in 40 CFR 261.5 (a) and (g).

[Comment: For the convenience of the regulated community, the primary hazardous properties of these materials have been indicated by the letters T (Toxicity), R (Reactivity), I (Ignitability) and C (Corrosivity). Absence of a letter indicates that the compound is only listed for toxicity.]

APPENDIX C

Source Reduction and Waste Minimization Plan

Environmental Philosophy

All wastes (including but not limited to hazardous and radioactive wastes) generated as a result of TAMU-CC activities will be managed in a manner that will minimize the potential for ill effects on human health and the environment. All lands held or managed by the Texas A&M University System, including trust lands and Permanent University Fund Lands, should be managed in a manner that will assure the proper use and protection of these natural resources and the environment for the benefit all.

Accordingly, all employees of Texas A&M University-Corpus Christi shall perform their duties in compliance with all applicable Federal, State, and local environmental laws, regulations, and ordinances. To the extent possible and subject to existing agreements, the Texas A&M University System shall also require its tenants and others using TAMU-CC property or engaging in System activities to comply with applicable environmental laws, regulations, and ordinances.

Each component institution and agency is expected to establish and maintain an Environmental, Health and Safety Committee and such other committees and subcommittees as necessary to address and monitor compliance with applicable environmental, health and safety guidelines, standards, laws, regulations, ordinances, and permit or license requirements.

Additionally, the TAMU-CC Environmental, Health & Safety Department is committed to encouraging appropriate training so that administrators, supervisors, employees, and students can perform their duties and conduct their activities in an environmentally responsible and safe manner. To this end, guidance and technical support will be provided to develop environmental and safety training programs.

Further, Texas A&M University-Corpus Christi is committed to make reasonable efforts to minimize waste generated as a result of TAMU-CC activities and to achieve the goals set out in Governor's Executive Order AWR-92-2, Texas Waste Reduction Policy Act (1991) and other applicable requirements.

Source Reduction and Waste Minimization Plan

I. Introduction

Early federal regulations on disposal of hazardous waste were aimed at controlling pollution of the environment. Today, the focus is shifting from controlling pollution to preventing pollution. The Pollution Prevention Act of 1990 (Federal Regulation) made the prevention of pollution and reduction of waste generation a national priority. Texas Waste Reduction Policy Act (Senate Bill 1099 of 1991) requires industries, businesses, and institutions that generate hazardous waste or release toxins into the environment to prepare a Source Reduction and Waste Minimization Plan. Presently, this plan will influence the activities at Texas A&M University-Corpus Christi. To this end, the TAMU-CC Environmental, Health & Safety Department shall coordinate development and implementation of appropriate procedures.

The cost of commercial waste disposal continues to rise and the amount of waste generated continues to increase. Although we cannot control disposal costs, the amount of waste generated can be reduced. Emphasis is placed on "Front-end waste minimization"(reducing the amount and toxicity of hazardous materials used) as the primary means for reducing hazardous waste. At TAMU-CC, research and teaching laboratories and other working groups (Facilities Services, etc.) should examine their purchasing practices and systems, their chemical usage, and workplace activities to identify potential points of their operations where source reduction and waste minimization can be implemented.

Reduction of the volume and hazard of chemical waste benefits the public by protecting their health and safety, the environment, and by reducing disposal costs. The volume and type of hazardous waste disposed of determines these costs. Volume of waste can be reduced through source reduction and by recycling. Texas A&M University-Corpus Christi's approach is intended to fulfill the requirements of the law, to achieve economic benefits, and to be an extension of the Texas A&M University-Corpus Christi's Environmental Philosophy.

II. Hazardous Waste Streams at Texas A&M University-Corpus Christi

Texas A&M University-Corpus Christi generates several waste streams. Many times there are not EPA approved methods for source reduction and minimization for these lab waste streams. For this reason, laboratories face a greater challenge in managing hazardous waste. Below is a list of the generators and broad categories of the waste streams generated at TAMU-CC. 24

WASTE STREAM	TEXAS CODE NUMBER	GENERATORS
1. Spent acid with metals	0001103H	Laboratories Transportation
2. Halogenated/Non-Halogenated Solvents	0002204H 0017202H 0501203H	Laboratories Paint Shop Area Maintenance Print Shop Transportation Student Services Spill Cleanup
3. Spent acid without metals	0004104H	Laboratories
4. Caustic Aqueous Waste	0007110H	Laboratories
5. Oil-water emulsion/mixture	00052051	Laboratories Transportation Area Maintenance Spill Cleanup
6. Other waste organic liquids or solids	00152191 00164091	Laboratories Spill Cleanup
7. Other waste inorganic solids	00113191	Laboratories Spill Cleanup Area Maintenance
8. Aqueous waste with other low toxic organics	0012102H	Laboratories Transportation Wastewater Treatment Plant
9. Aqueous waste with other low toxic inorganics	0010114H 0012102H	Laboratories Area Maintenance Transportation
10. Other aqueous waste with low dissolved solids	00611411	Laboratories
11. Asbestos solids, debris, and non - friable asbestos	00133111 00223112	Building Renovations
12. Mixed Labpacks	0003003H	Spill Cleanup
13. Organic paint, ink	0009209H	

III. Source Reduction and Waste Minimization Goals

Waste Source Reduction Goals

1. Develop and institute programs that will encourage and assist individual generators in modifying their patterns of purchase and use of hazardous chemicals.
2. Increase utilization of computerized systems to manage purchase and inventory of hazardous chemicals.
3. Educate individual and departmental generators in techniques for reducing the quantity and cost of hazardous waste disposal (e.g., use smaller quantities, substitution of less hazardous chemicals, proper labeling, return agreements for compressed gas cylinders, etc.).
4. Substitution for less hazardous chemicals
5. Proper labeling
6. Improved inventory control
7. Spill prevention

Waste Source Reduction Techniques

1. Chemical/Equipment Purchases and Inventory Control
 - a) Utilize computerized tracking systems as chemical management tools for chemical purchase and inventory control. Maintain current inventories of chemical stocks to prevent the ordering of chemicals that may already be in stock and in order to monitor the shelf lives of remaining chemicals. Develop a campus-wide chemical exchange network - between labs and within labs, Departments, Colleges, etc. to reduce "warehousing", promotes sharing of chemicals, and avoids redundant purchases.
 - b) Negotiate contracts with chemical suppliers to gain volume discounts based on annual volume of chemicals purchased. In these contracts, insist on flexible delivery schedules of fewer, smaller-sized containers without cost penalties. This may require centralized purchasing and distribution of all chemicals.
 - c) Purchase reagent chemicals in quantities that are appropriate to the scale of the experiment being used. Limit acquisition of chemicals to quantities required for immediate use. Do not order quantities to obtain special unit cost savings. These savings will normally be lost due to eventual disposal costs if the chemical is not entirely used.

- d) Obtain compressed gases when possible from vendors who will accept return of their empty or partially full cylinders.
- e) Include waste generation as criteria in equipment selection.
- f) Rotate chemical stocks in order to use chemicals before their shelf lives expire.

Chemical Usage

- a) Enhance chemical exchange program by using lab procedures that assure the integrity of chemical quality.
- b) Reduce spills and wastes generated by pre-weighing chemicals for undergraduate use
- c) Require proper labeling of all secondary containers. Replace all deteriorating labels on primary and secondary containers.
- d) Substitute less hazardous chemicals whenever possible. Example: biodegradable scintillation cocktails instead of xylene or toluene based cocktails. Minimize the use of heavy metals (silver, chrome, mercury, barium, cadmium, and lead) chemicals.
- e) Substitute alcohol or electronic thermal monitors for mercury thermometers.
- f) Use No-Chromix, detergents, or enzymatic cleaners instead of sulfuric/chromic acid cleaning solutions for cleaning laboratory glassware.
- g) Minimize solvent waste by recycling or substitution.

Waste Minimization Goals

1. Incorporate hazardous waste minimization procedures into research and teaching protocols.
2. Develop systems in laboratory classes that utilizes products of one experiment as components for subsequent experiments.
3. Purify used solvents for reuse.
4. On-site neutralization of inorganic acids and bases for sewer disposal.
5. Use laboratory waste solvent in non-laboratory workplaces.

Waste Minimization Techniques

1. Prevent the mixing of different types of waste. Do not put non-hazardous waste, such as a mixture of water, sodium bicarbonate, and acetic acid, into a waste container of hazardous waste. Do not put inorganic heavy metal waste in with solvents as this will increase disposal costs. Segregate halogenated waste solvents from non-halogenated waste solvents.
2. Keep waste streams segregated by storing them in separate waste containers. Label waste containers with the full name(s) of the waste material(s) stored in them. Also, keep waste containers stored separately from reagent containers still in use to avoid accidental contamination of the reagent chemicals.
3. Decontaminate empty containers to prevent them from being handled as hazardous wastes.
4. Neutralize dilute acids and bases making them non-hazardous and suitable for drain disposal.
5. When possible, redesign experimental protocols so that harmful byproducts are detoxified or reduced in volume as a final step.
6. Recycle chemicals via in-house purification processes or off-site vendors. Distillation or filtration of solvents, Freon, and used oils for reuse in certain areas results in significant reductions in waste disposal.
7. Make lab employees' accountable for the waste generated by experiments or orphan chemicals when labs are decommissioned.

Texas A&M University-Corpus Christi Goals

The source reduction and waste minimization goals of this plan are:

1. Comply with all government regulations regarding management of hazardous waste.
2. Manage hazardous waste using the most responsible and environmentally sound methods.
3. Increase the awareness of all employees of their responsibility for reducing hazardous waste and pollution prevention.
4. Improve the effectiveness and efficiency of the waste management program and reduce the costs of waste handling and disposal.
5. Reduce the risk to human health and environment by proper waste management.

Employee Awareness and Training Program

Source reduction/waste minimization training is a fundamental responsibility of all TAMU-CC students, faculty, and staff. Appropriate training is provided to all employees and students in labs, shops, kitchens, offices, or other workplaces where hazardous waste is generated. The training and information is provided to employees at the time of their initial assignment to a work area, and to students within a reasonable period after enrollment in a course or lab involving hazardous waste generation. The TAMU-CC Environmental, Health & Safety Department provides guidance and technical support for development of environmental training for employees and students.

Training is intended to keep personnel informed of issues and technologies related to pollution prevention and waste minimization. Information and training is provided in the following categories:

1. Regulations and laws effecting pollution prevention and hazardous waste generation;
2. Personal protection equipment;
3. Hazardous materials and hazardous waste;
 - A. Proper storage;
 - B. Safe and proper handling;
 - C. Disposal/recycling;
 - D. Transportation;
4. Inventory tracking;
5. Acquisition of hazardous materials and equipment;
6. Substitution/elimination of hazardous materials;
7. Economic/environmental ramifications of hazardous waste generation and disposal