

**SOURCE REDUCTION/WASTE MINIMIZATION
PLAN**

FOR

TEXAS STATE UNIVERSITY – SAN MARCOS

**601 UNIVERSITY DRIVE
SAN MARCOS, TEXAS 78666**

JANUARY 2005

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- A** [Environmental Health and Safety Policy](#)
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1.0 INTRODUCTION

This Source Reduction/Waste Minimization Plan (SR/WM) was prepared for Texas State University – San Marcos (the University) to comply with Senate Bill 1099. This bill requires generators of hazardous wastes (large and small quantity) to prepare a SR/WM plan. This plan includes the components required by the Texas Commission of Environmental Quality in TAC 35 Subchapter Q.

1.1 FACILITY DESCRIPTION

Texas State University – San Marcos is a four-year accredited university located at 601 University Drive in San Marcos, Texas. The University is the sixth largest university in the state with a student population of greater than 26,000. The University offers undergraduate and graduate programs in seven colleges: Applied Arts, Business Administration, Education, Health Professions, Fine Arts and Communication, Liberal Arts and Science.

From various maintenance activities and routine laboratory practices, the University generates hazardous and non-hazardous waste. The University is registered with the Environmental Protection Agency (EPA) and the Texas Commission on Environmental Quality (TCEQ) as a large quantity municipal generator. The Texas solid waste registration number is 66137 and the EPA I.D. number is TXD980812168.

1.2 SOURCES OF HAZARDOUS WASTE GENERATION

Hazardous wastes are generated as a result of teaching, research and operational activities at the University. The Risk Management and Safety Office (RMSO) is responsible for proper handling and ultimate disposal of these wastes. RCRA hazardous wastes are generated at the following departments:

1. Physical Plant Shops and Garage
2. Print Shop
3. Art Department
4. Chemistry and Biochemistry
5. Aquatic Biology
6. Biology
7. Physics
8. Agriculture Labs and Garage (Used Oil/Batteries only)
9. Technology

10. Edwards Aquifer Research and Data Center

The various departments may generate general types of wastes such as solvent waste or acid waste, or specific wastes such as mercury or silver laden waste. Each of these wastes is assigned a unique waste code in accordance with the TCEQ Guidance (April 2000, Guidelines for the Classification and Coding of Industrial and Hazardous Wastes, RG-22). The waste codes are included on the TCEQ Notice of Registration (NOR).

1.3 WASTE IDENTIFICATION/WASTE VOLUME

[Table 1](#) lists the hazardous wastes generated at the University. Most of the hazardous waste is managed by a permitted treatment, storage and disposal facility (TSDF) that is allowed to bulk waste and send it with wastes from multiple generators to appropriate disposal facilities.

[Table 2](#) summarizes the volume of hazardous waste disposed of offsite by the University over the past four years. The six top waste streams are shown in bold based on volume and toxicity. These hazardous waste streams will be targeted for reduction by the University and addressed by this plan. Because the University's SIC code is 8221, they are not required to report emissions through SARA Section 313 Toxic Release Inventory Reports. This plan addresses hazardous waste reduction only.

1.4 COMMITMENT TO THE ENVIRONMENT

Texas State University will continue to maintain environmental responsibility and compliance to regulatory requirements as top priority. The University's vision statement includes the commitment to be ethical, responsible and protective of the environment. This commitment is stated in the enclosed Environmental Health and Safety Policy signed by the president Dr. Denise Trauth (**Attachment A**).

1.5 EMPLOYEE AWARENESS AND TRAINING

Employees working with chemical purchasing and waste generation will be trained to increase awareness of the environmental policy of pollution prevention reduction. This training will occur during new employee orientations and on an annual basis. If the procedures change within this plan, affected employees will receive training at that time as well.

Training will be provided to the employees to keep them informed of issues and technologies related to pollution prevention and waste minimization. The specific format of the training will be dependent on the scope of work for each group or department. The training will include information on pollution prevention definitions and laws as well as new and developing technologies and strategies to meet the reduction goals. The Risk Management and Safety Office will disseminate pertinent information to the appropriate supervisors and employees.

2.0 SOURCE REDUCTION/WASTE MINIMIZATION GOALS

The University will strive to reduce the risk to human health and the environment and reduce the cost of offsite disposal through our source reduction/waste minimization program. The projects identified as potentially beneficial to meet these goals are described in more detail below.

2.1 PROPOSED SOURCE REDUCTION PROJECTS

The University has identified several key projects to pursue over the next five years (calendar year 2005 -2010). These projects are designed to reduce the six top waste streams identified in [Table 2](#). These proposed projects are described in more detail below and listed in [Table 3](#).

Micro scale Experiments

This method of experimentation is already used by some of the science departments on campus. Micro scale laboratory experiments utilize very small amounts of chemicals, reducing the quantities of hazardous materials used and hazardous waste generated. This technology involves purchasing appropriate glassware and reagents to implement. Other advantages of this method are:

- Reduced hazards to laboratory personnel
- Less expensive and more robust equipment
- Reduced heating/cooling and set up time for experiments
- Reduced volume of waste generated; typically 1/10th the amount generated by full scale experiments.

The EARDC has started using these methods for some testing and plans to phase in other testing to these methods.

Recycle Photographic Waste Silver/Additional Testing

This project involves using on-line silver recovery units (e.g. Pro-Cell 700 or similar) to remove the silver from photographic wastes. The silver is recovered from fixer solutions for resale to a recovery company such as Silver Consultants, Inc. of Houston, Texas. It is important to schedule the replacement of the recovery unit components to keep the concentration of silver leaving the units less than the hazardous characteristic limit of 5.0

mg/L. This can be best accomplished by routinely inspecting the cartridges and setting up a fixed schedule for replacement of the cartridges.

A second component of this project is sampling and analysis of the developer and fixer solutions to determine if they are hazardous due to the following hazardous waste characteristics:

- D002: corrosivity (i.e. is the pH less than 2.0 or greater than 12.5)
- D011: silver concentration in outlet of recovery unit (is it greater than 5.0 mg/L)
- D003: total sulfide concentration (sulfide concentration greater than 500 mg/L).

If the sample results exceed these limits, then the waste remains hazardous. If the sample results show consistent passing of the above limits then the waste stream is non-hazardous and can be reclassified.

Neutralize Acid and Base Waste as Part of the Experiment Protocol

If an experiment involves the use of acids and bases without the use of other organics or the following eight metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, silver), it is possible to reduce the corrosivity characteristic (D002) from the waste by neutralizing the wastes as the final step in the experimental procedure. An example of the types of acids and bases that can be neutralized safely is shown in **Attachment B** along with example safety procedures. It is critical that procedures be reviewed and approved by each department in association with RMSO. The neutralized waste will no longer carry the hazardous waste code and can be reclassified and disposed of as non hazardous.

Product Substitution

Substitution of less toxic or hazardous materials will result in smaller volumes of hazardous waste requiring disposal. Examples of substitutions that have been effective at other university labs are:

- For quantitative tests for halide ions, substitute cyclohexane instead of carbon tetrachloride
- For phase change and freezing point depression, substitute acetamide for stearic acid
- For glassware cleaning, substitute potassium hydroxide, sonic baths,alconox, Pierce RBS35 or enzymatic cleaners for chromic/sulfuric acid baths or alcoholic

- potassium hydroxide baths. The latter solutions are not only hazardous, but have high disposal costs due to the corrosivity of the products.
- Substitute non-mercury thermometers (red liquid, digital, or thermocouple) for mercury thermometers
 - Substitute high flashpoint scintillation fluids (e.g. Ecoscint)
 - Substitute ethanol for formaldehyde for specimen preservation.

Implement Chem Swap Program

This program has been implemented successfully at different Universities as a method to reduce the amount of commercial chemical product disposed of. These products typically are generated from laboratory cleanouts, stockroom cleanouts, or research laboratory decommissioning. According to the definition of U and P listed wastes, the product is only a waste when it is discarded. Use of these chemicals rather than disposal keeps them out of the hazardous waste classification. The Chem Swap program allows laboratory professors and personnel to obtain free of charge unused chemicals donated by other departments. The basic components of this program are:

- RMSO maintains the inventory in clean, well labeled storage cabinets (Labeled “Chem Swap Program”);
- RMSO marks the initial date they receive the product; for recycle the product must be reused within one year or sent offsite for disposal;
- RMSO posts a listing of the products available including both chemicals and cleaned glassware on their website;
- Only professors or laboratory technicians can request the chemical (not students);
- Only unopened, uncontaminated chemicals are accepted;
- Labels must be in good condition and the shelf life of the material must be good;
- If a department wants a chemical, they post the request to RMSO and a RMSO trained staff will deliver the product to the department. The same procedure follows for a department that wants to donate an unused chemical to the Chem Swap program.
- The service is free to the chemical provider and free to the chemical receiver; and
- For glassware, a tracking form must be completed to document which department has the glassware exchanges (in compliance with a 1995 MOU between the Texas Higher Education Coordinating Board and the Texas Department of Public Safety).

2.2 SCHEDULE OF IMPLEMENTATION AND MEASURABLE GOALS

The proposed schedule of implementation for these projects is listed in [Table 4](#). The schedule covers the period of time from 2005 to 2010. The University is dedicated to reduce the volume of hazardous waste by 30% over the next five years. The baseline for this assessment is the year 2004. The annual waste reduction reports will use 2004 values as a baseline for determining if the reduction goals are being met.

Certificate of Completion

This document certifies that the Source Reduction/Waste Minimization Plan has been completed and meets the specific requirements of the Waste Reduction Policy Act of 1991, the Solid Waste Disposal Act, and 30 TAC Sections 335.471 – 335.480, and that the information provided herein is true, correct and complete.

This document also certifies that the person whose signature appears below has the authority to commit the corporate resources necessary to implement the plan.

Approved by UPPS 04.05.06, December 15, 2004

Dr. Denise Trauth

President

Texas State University – San Marcos

Tables

Source Reduction/Waste Minimization Plan

TABLE 1

Hazardous Wastes Generated
Texas State University
San Marcos, Texas

TCEQ Waste Code	<i>Waste Description</i>	EPA Waste Code	Most Common Method of Disposal
<i>Hazardous</i>			
0001204H	Mixed halogenated/non-halogenated solvents from labs throughout campus and solvents consolidated at the storage facility.	D001, F001, F002, F003, F005	Incineration or fuel blending
0002103H	Acids with metals from campus labs	D002, D005, D006, D007, D008, D009, D011	Wastewater treatment
0003003H	Mixed lab packs containing hazardous chemicals from campus labs. Lab packs contain no acute hazardous waste.	D001, D002, F001, F002, F003, F005, U057, U195, U239	Incineration
0004198H	Photographic waste may contain silver, may be reactive	D011, D003	Silver recovery and wastewater treatment
0007119H	Laboratory waste - inorganic	D003	Wastewater treatment
0010117H	Mercury waste or aqueous mercuric salt solutions	D009, D002	Mercury recovery and wastewater treatment
0013209H	Waste paint from shop and painting activities on campus – INACTIVE (as of August 2004)	D001	Recycle/Fuel blending
0014211H	Paint Thinner or petroleum distillates from cleaning equipment – INACTIVE (as of August 2004)	D001	Recycle/Fuel blending
0016219H	Caustic liquids from consolidating lab wastes, Flammable caustics	D001, D002, F002, F003	Incineration

TABLE 1 (continued)

Hazardous Wastes Generated
 Texas State University
 San Marcos, Texas

TCEQ Waste Code	<i>Waste Description</i>	EPA Waste Code	Most Common Method of Disposal
0017219H	Lab waste consolidation, Flammable acids	D001, D002, F002, F003	Incineration
0020310H	Activated carbon filters, spent or out of date	D001	Regenerate
0021202H	Spent halogenated solvents and aqueous mixtures	D001, F001, F002	Incineration or Fuel blending
0022203H	Spent non-halogenated solvents and aqueous mixtures	D001, F003, F005	Incineration or Fuel blending

Table 2
Summary of Hazardous Waste Generation
Texas State University
San Marcos, Texas

TCEQ Waste Code	Waste Description	Base Year 2004 (lbs)	2003 (lbs)	2002 (lbs)	2001 (lbs)
0001204H	Water w/spent solvents (nonhalogenated)	257	104	500	0
0002103H	Generic acid with metals	1,277	2,170	2,230	400
0003003H	Mixed lab packs with hazardous chemicals	10,284	5,797	4,531	3,883
0004198H	Bulk fixer waste, may contain silver or be reactive	1,159	694	1,065	1,200
0007119H	Inorganic laboratory waste: may include cadmium ww	704	648	680	400
0010117H	Mercury waste or mercury ww	1,831	511	920	200
0014211H	Paint thinner or petroleum distillates, flammable liquids	7,153	3,394	1,990	0
0016219H	Caustic (basic) liquids, flammable bases	223	581	230	0
0017219H	Flammable acids	1,976	1,187	720	0
0022203H	Spent non halogenated solvents and aqueous mixtures (new code for 2004)	123	n/a	n/a	n/a
UNIV209H	Paint waste (changed to universal status in 2004)	3,150	1,703	n/a	n/a
Total (lbs)		28,137	16,789	12,866	6,083
Total (tons)		14	8	6	3

Note:

Bold entries are those wastes targeted for reduction by this plan.

Table 3. Proposed Source Reduction/Waste Minimization Projects

Source Reduction Activity	Resulting Waste Eliminated or Reduced
1. Use micro scale experiments instead of full scale experiments in laboratory testing (classroom and EARDC).	<ul style="list-style-type: none"> • Hazardous waste lab packs. (0003003H) • Mercury wastes (0010117H) • Laboratory wastes inorganic (0007119H)
2. Recycle photographic waste silver/additional testing to classify photographic solutions.	<ul style="list-style-type: none"> • Bulk fixer/photographic waste (0004198H)
3. Neutralize acid and base wastes during the experiment or lab test to remove the hazardous waste characteristic of corrosivity. Collect and segregate the non-hazardous waste for treatment on site or offsite.	<ul style="list-style-type: none"> • Generic acids with metals (0002103H)
4. Product substitution in teaching labs, research labs and EARDC labs.	<ul style="list-style-type: none"> • Generic acids with metals (0002103H) • Caustic/flammable liquids (0016219H) • Spent halogenated solvents (0021202H)
5. Implement a Chem Swap program to use commercial chemical products rather than discard them.	<ul style="list-style-type: none"> • Hazardous waste lab packs. (003003H) • Spent halogenated solvents (0021202H) • Spent non halogenated solvents (0022203H)

Table 4. Schedule of Implementation and Measurable Goals

Source Reduction Activity	Schedule of Implementation
1. Use micro scale experiments instead of full scale experiments in laboratory testing (classroom and EARDC).	Assess during the first quarter of calendar year 2005 and implement if feasible during fiscal year 2006. Will need budget approval to purchase micro scale equipment and supplies.
2. Recycle photographic waste silver/additional testing to classify photographic solutions.	Implement testing during the first quarter of 2005 for all departments that generate photographic waste. Obtain new non-hazardous waste code, if necessary, during the first or second quarter 2005 and implement segregated disposal procedures immediately.
3. Neutralize acid and base wastes during the experiment or lab test to remove the hazardous waste characteristic of corrosivity. Collect and segregate the non-hazardous waste for treatment on site or offsite.	Assess during the first quarter of calendar year 2006 and implement if feasible during fiscal year 2007. Should not require capital expenditure, but will require addition of several steps to the end of each experiment or laboratory test that generates acidic waste. This project does <i>not</i> apply to any wastewater that may contain the 8 RCRA metals above the TC limits (e.g. mercury or cadmium wastewaters)
4. Product substitution in teaching labs, research labs and EARDC labs.	Determine feasibility of each product substitution during first quarter 2007 and implement feasible substitutions in first quarter 2008.
5. Implement a Chem Swap program to use commercial chemical products rather than discard them.	Research options used at other Universities during the second quarter 2005. Discuss feasibility and implementation issues with departments utilizing chemicals. If feasible, phase in project over the third and fourth quarter 2005.

ATTACHMENT A

Environmental Health and Safety Policy Statement

University Policy Statement UPPS 04.05.06

Approved on 12-15-04

Revised: 12/15/2004

Hazardous Materials and Waste Management

UPPS No. 04.05.06

Issue No. 6

Effective Date: 8/21/2002

Review: October 1 E3Y

Attachments I, II, III, IV, V

*01. POLICY STATEMENTS

- 01.01 Hazardous materials and hazardous waste can pose a threat to students, employees, visitors and the environment if managed improperly. To minimize the possibility of such threats, appropriate practices and procedures are essential. The purpose of this policy is to establish a hazardous materials and hazardous waste management program.
- 01.02 The Environmental Health and Safety Office (EHSO) has primary responsibility for the university's hazardous materials and waste management program. The manager of EHSO (or designee) is authorized to take action to assure compliance with applicable regulations and policies and to minimize physical and environmental threats on university property (whether owned or leased). This includes having delegated authority from the President to order the cessation of activities or operations, as needed, to administer this policy.
- 01.03 The University is registered as a hazardous waste generator by the Environmental Protection Agency (EPA) and the Texas Commission for Environmental Quality (TCEQ). Procedures outlined in this UPPS are designed to promote the protection of health and the environment by compliance with applicable regulations.
- 01.04 Hazardous materials and waste that are not properly packaged and labeled may not be transported.
- 01.05 University employees who transport regulated quantities of hazardous materials or hazardous waste are required to maintain a valid Texas commercial driver's license.
- 01.06 Non-compliance with hazardous materials and hazardous waste regulations can result in violations being charged against the University by regulatory agencies, as well as the assessment of fines and other costs. Disciplinary action may be taken against university personnel or students who do not comply with this policy and associated regulations.

02. DEFINITIONS

- 02.01 Hazardous Materials - any materials that may present a health or physical hazard to individuals when handled in the normal course of their work.
- 02.02 Hazardous waste - any substance identified or listed as a hazardous waste by the administrator of the United States Environmental Protection Agency (EPA), 40 CFR 261, Identification and Listing of Hazardous Waste.
- 02.03 Biohazard waste - any contaminated waste material that is capable of transmitting disease to workers or handlers.
- 02.04 Departmental Hazardous Waste Generator - any department or activity associated with the University with processes or experiments resulting in a hazardous waste.
- 02.05 Management Program - related to this policy, management encompasses the functions of acquisition and use of hazardous materials and disposal of hazardous waste.

- 02.06 University Hazardous Waste Management Unit - a university facility that is registered with TCEQ for storage of hazardous waste prior to shipment for disposal.
 - 02.07 Spill Prevention Plan - a written policy that includes emergency procedures for spill prevention and clean up of hazardous materials or hazardous waste.
 - 02.08 Chemical Hygiene Plan - a written program developed and implemented by the department which sets forth procedures, equipment, personal protective equipment, and work practice that 1) are capable of protecting employees from the health hazards presented by hazardous chemicals used in that particular work place and 2) meet Occupational Safety and Health Administration (OSHA) requirements.
 - 02.09 Departmental Hazardous Materials Coordinator - an individual who is designated by the academic department chair or staff account manager to act as liaison with the EHSO for proper management of hazardous materials used or waste generated by their department.
03. HAZARDOUS MATERIALS MANAGEMENT PROCEDURES
- 03.01 Hazardous materials or materials which may become hazardous waste must be handled in such a way as to protect that health and safety of university students, personnel, property, and the environment. (See also UPPS No. 04.05.05, Hazard Communication Program.)
 - 03.02 Purchase of Hazardous Material
 - a. Hazardous materials should be purchased in a manner that minimizes the quantity of hazardous materials in the work area and hazardous waste generated.
 - b. Because of federal and state regulations regarding the procurement of hazardous materials, all such purchases must be via an approved university purchase order. Use of alternate approved university procurement methods, including procurement cards (P-cards) to purchase hazardous materials is strictly prohibited.
 - c. Departments should coordinate their hazardous material purchases with other university departments, to minimize individual departmental quantities ordered and stored while realizing the cost saving from volume purchases.
 - 03.03 Hazardous materials must be stored in a safe and secure area that cannot be accessed by unauthorized individuals.
 - 03.04 Appropriate supervision and training is required for all situations in which hazardous materials are utilized at the University. (See also UPPS No. 04.05.05, Hazard Communication Program).
04. HAZARDOUS WASTE DISPOSAL PROCEDURES
- 04.01 Management of hazardous waste for disposal is strictly limited to the Environmental Health and Safety Office. University departments or areas that handle hazardous materials and hazardous waste are not authorized to undertake disposal procedures without contacting the Environmental Health and Safety Office.
 - 04.02 The disposal of hazardous waste by hazardous waste generators is strictly controlled by local, state and federal regulations. All university departments, activities, and personnel shall be familiar with and comply with applicable regulations regarding the safe handling, labeling, and disposal of hazardous waste. These include:

- *a. 31 TAC Chapter 335, Industrial Solid Waste, and Municipal Hazardous Waste Regulations; TCEQ.
<http://www.tceq.state.tx.us/index.html>.
 - b. 40 CFR, Parts 260 through 265, Identification and Listing of Hazardous Waste; EPA.
www.epa.gov
 - c. 29 CFR, Part 1910; Occupational Safety and Health Standards Act (OSHA).
www.osha.gov
 - d. UPPS No. 04.05.05, Hazard Communication Program.
 - e. City of San Marcos Wastewater Pre-treatment Ordinance.
www.ci.san-marcos.tx.us
- 04.03 Biohazard waste generated at the University is to be collected in approved biohazard bags or containers. Biohazard waste requires special treatment on site at the generation point, when feasible. If treatment cannot be performed on site, EHSO will assist departmental generators in securing an appropriate means of disposal.
- 04.04 Timeframe for disposition of hazardous waste - removal of hazardous waste from a university department or area should be accomplished within 72 hours of being characterized as hazardous waste. Departments or areas that have hazardous materials or materials which may become hazardous waste must contact EHSO to arrange for disposal. Generally, the items will be moved to a designated hazardous waste unit.
- 04.05 Hazardous waste will be stored in a designated university hazardous waste management unit where an authorized contractor can remove the waste for disposal. Alternatively, EHSO may arrange for the authorized contractor to pick up hazardous waste directly from a university department or activity. Hazardous waste must be properly characterized prior to removal from the generating department or area.
- 04.06 Departmental hazardous waste generators must continually monitor the hazardous waste being generated in their area and coordinate with EHSO to have the waste removed as it is generated.

05. RESPONSIBILITIES

- 05.01 Environmental Health and Safety Office (EHSO) - under the administrative oversight of the Risk Management and Safety Department, EHSO has primary responsibility for the following duties associated with the management program for hazardous materials and waste:
- a. Act as the custodian of required regulatory records for EPA, Department of Transportation (DOT) and TCEQ.
 - b. Provide, as office of record, all necessary reporting requirements to local, state, or federal agencies as it pertains to the management of hazardous materials and waste.
 - c. Coordinate disposal of all university hazardous waste, including acting as liaison between the hazardous waste generator (university department or activity) and the hazardous waste disposal contractor. EHSO also develops specifications and obtains bids, in accordance with university purchasing guidelines, for the University's hazardous waste disposal service.
 - d. Assist department heads, account managers and other university personnel in managing their departments' hazardous materials and waste. This includes, but is not

- limited to, interpreting applicable regulations, coordinating or conducting personnel training, and establishing coordinated inspections of work areas.
- e. Identify university departments or activities which are Hazardous Waste Generators based on the use of hazardous materials in the work area that are not used up in a process or equipment and which require disposal. Ensure that each hazardous waste stream is properly characterized for inclusion in the University's Notice of Registration (NOR) to the TCEQ. University activities that have been identified as hazardous waste generators are listed in Attachment I.
 - f. Coordinate with TCEQ, EPA and DOT, as required, to resolve matters relating to the regulation of hazardous waste.
 - g. Assist departmental Hazardous Materials Coordinators to develop Spill Prevention Plans, Chemical Hygiene Plans, prepare hazardous waste for disposal, and assist emergency response agencies to control a spill or potential chemical hazard.
 - h. Review and approve departmental chemical hygiene or spill prevention plans.

- 05.02 Department Heads and Account Managers - all university department heads, account managers, and other personnel who are responsible for a department or activity in which hazardous materials are utilized or in which hazardous waste is generated have primary responsibility for assuring that applicable federal, state and local regulations and university policies and procedures are followed. Other responsibilities include:
- a. Maintain a Work Area Chemical List (WACL) and Material Safety Data Sheet (MSDS) file. Identify those chemicals that contain hazardous ingredients and require the use of appropriate personal protective equipment (PPE), while insuring that storage, handling, and disposal is performed in accordance with university procedures. (See also Hazardous Communication Program, UPPS No. 04.05.05).
 - b. Confer with the Environmental Health and Safety Office to assure that their department's hazardous materials and waste management practices conform with applicable regulations and policies.
 - c. Assure that personnel and students who are involved in the acquisition, handling, use, experimentation, or disposal of hazardous materials or waste are properly supervised and trained. This includes, but is not limited to, ensuring that these individuals use appropriate protective clothing and equipment, are informed about the materials involved, and know proper spill control prevention procedures.
 - d. Assure proper identification of waste chemicals, containerization, labeling, and storage within the department.
 - e. Report hazardous chemicals to be processed for disposal to the EHSO for coordination of pick up, storage, transport, and disposal. To facilitate removal and disposal of the hazardous materials or waste from the work area the following requirements must be met:

- 1) Hazardous waste generators will complete a Waste Chemical Data Sheet for each chemical to be disposed of (Attachment II).
 - 2) Prepare a Chemical Removal Request Form (Attachment III) listing each chemical item to be disposed of. The request form will be forwarded to the Risk Management and Safety Department with the Waste Chemical Data Sheets attached.
 - 3) Unknown chemicals will have to be tested to characterize the waste stream.
- f. Designate a departmental hazardous waste coordinator.

- 05.03 Environmental Health Specialist (EHS) - designated EHSO personnel may perform a variety of duties associated with the university's Environmental Health and Safety Program. With regard to the management and disposal of hazardous materials and waste, this may include (but is not limited to) the following:
- a. Check the Waste Chemical Data Sheet for completeness, identify the proper waste stream, and prepare Chemical Labels (Attachment IV) to be applied to the containers.
 - b. After assessment of the waste data, the EHS will come to the work area to verify the chemical data and insure the chemical is in a suitable container. If the chemical is ready for disposal, the EHS will apply the Chemical Label to the container and arrange for removal of the waste.

06. PROCEDURES FOR HANDLING AND PREVENTING SPILLS OF HAZARDOUS MATERIALS OR WASTE

- 06.01 All spills of hazardous materials or waste must be immediately reported to the Environmental Health and Safety Office. Spills of hazardous materials will be handled in accordance with the instructions on the respective MSDS (information provided with each chemical purchased from the manufacturer).
- 06.02 All departments or activities with hazardous materials and waste must have a Spill Prevention Plan implemented within the work area. All personnel in the work area will be familiar with the plan. At a minimum, the Spill Prevention Plan will:
- a. Require posting of the following information next to telephones that may be used to summon emergency assistance. This shall include the:
 - 1) Name and telephone number of the emergency coordinator (EHSO and representative from the department);
 - 2) Location of fire extinguishers, eye wash stations, and emergency showers;
 - 3) Location of spill control material and cleanup supplies;
 - 4) The telephone number of the San Marcos Fire Department.
 - b. Require training of all personnel in spill prevention and clean up procedures for the hazardous materials and waste being generated;
 - c. Require availability of necessary spill control materials to contain the spill;
 - d. Require use of personal protective equipment (PPE) in the use and clean up of hazardous materials or waste;

- e. Require personnel to report spills to their supervisor, the University Police Department and the Environmental Health and Safety Office.
- 06.03 A copy of the department or activity Spill Prevention Plan must be readily available to the Environment Health and Safety Office for their review and approval. It is suggested that consideration be given to posting the Spill Prevention Plan on the departmental web site.
- 06.04 Spill Prevention Plans may be specific to individual departments or activities, or may be standardized for an entire college or division or other area with common needs and activities. Standardization of plans within colleges, departments, or areas can be beneficial to their employees, as well as to the Environmental Health and Safety Office.
- *07. HAZARDOUS MATERIALS AND WASTE MANAGEMENT PROGRAM
- 07.01 The University's Hazardous Materials and Waste Management Program includes initiatives to reduce the quantity of hazardous waste generated. The Source Reduction/Water Minimization Plan (SR/WM) as presented in Attachment V is prepared to comply with Senate Bill 1099 and includes the components required by the Texas Commission of Environmental Quality in TAC 35 Subchapter Q.
08. REVIEWERS OF THIS UPPS
- *08.01 Reviewers of this UPPS include the following:
- | Position | Date |
|---|---------------|
| Mr. Richard Gartman, Director
Risk Management and Safety Dept. | October 1 E3Y |
| Dr. Ruth Welborn, Dean
College of Health Professions | October 1 E3Y |
| Dr. Emilio Carranco, Director
Student Health Center | October 1 E3Y |
| Mr. Pat Fogarty, Associate Vice President
for Facilities | October 1 E3Y |
09. CERTIFICATION STATEMENT
- This UPPS has been approved by the following individuals in their official capacities and represents Texas State policy and procedure from the date of this document until superseded.
- Mr. Richard Gartman, Director, Risk Management and Safety Department;
senior reviewer of this UPPS
- Dr. Carolyn Conn, Associate Vice President for Financial Services/Treasurer
- Mr. William A. Nance, Vice President for Finance and Support Services
- Dr. Denise M. Trauth, President

ATTACHMENT B



Environmental Protection Management

Neutralization & Proper Destruction

Many chemicals used in the laboratory can be made less or even non-hazardous by lab personnel as the final step in protocol. Incorporate these procedures into the experimental protocol, whenever possible, and call [EPM](#) if you have a specific chemical of interest that is not described below.

Simple diluted acid & base neutralizations:

- Use appropriate personnel protective equipment and chemical fume hood (chemically resistant gloves, goggles or face shield, lab coat, and plastic apron.
- Keep solutions cool in an ice bath to reduce the generation of heat and fumes.
- Always add acid to water or base to water. NEVER REVERSE.

Acid Neutralization:

1.	Slowly add dilute (5N or less) acid solution to a large dilute amount of an ice water mixture of either sodium carbonate, calcium hydroxide, potassium hydroxide, or 10M sodium hydroxide. Stir constantly while adding acid.
2.	Check pH frequently (acceptable range is 6 to 8).
3.	Flush down sink with copious amounts of water.

Some acid should never be neutralized, due to either their high reactivity, creation of toxic residues, or other high inherent hazards including:

Acetic Acid	Acid Anhydrides and Chlorides
Chlorosulfonic Acid	Fuming Nitric and Sulfuric Acid
Hydrofluoric Acid	Trichloro- and Trifluoro- Acetic Acids
Liquid Halides of Boron, Silicon, Tin, Titanium, and Vanadium	Liquid Halides and Oxyhalides of Phosphorus, Selenium, and Sulfur

Base Neutralization:

1.	Dissolve solid base in a large volume of iced water, stir well,
2.	Slowly add a 1N or 2N solution of hydrochloric acid
3.	Check pH frequently (acceptable range is 6 to 9)
4.	Flush down the sink with copious amounts of water

Ethidium Bromide Deactivation:

Ethidium bromide (EtBr) is commonly used in molecular biology laboratories for visualizing nucleic acids and as a running buffer in electrophoresis. While it is not regulated as hazardous waste, it is a known mutagen and should be managed with care:

For EtBr solution concentrations at 0.01 and 0.001, use a 1:1 ratio treatment with bleach to inactivate biologicals, then discard down the sink

EtBr gels at 0.01 and 0.001 may be managed as biological waste (collect and dispose of in red bag)

EtBr solution and gel concentrations greater than 0.01 should be managed as hazardous chemical waste, contact [EPM](#)

EtBr contaminated Pasteur pipettes and other sharps must be accumulated in sharps containers and managed as biological waste (dispose of in red bag)

An alternative for managing EtBr solutions is the Ethidium bromide "green bag" disposal kit. The disposal kit contains activated carbon that absorbs EtBr from solutions (10 mg EtBr/bag). Once the "green bag" reaches adsorption capacity (limit is specified in kit instructions) for EtBr, the "green bag" can be disposed of as a solid hazardous waste through [EPM](#). Solutions treated with the "green bag" can be washed down the drain. The kit is a good idea and satisfies waste disposal requirements. If you want more information you can call (800) 424-6101 for ordering and technical support or web at <http://www.bio101.com/>.

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