

**POLLUTION PREVENTION (P2) PLAN
YEARS 2023-2027**

FOR

Texas Woman's University – Denton Campus



**TEXAS WOMAN'S
UNIVERSITY™**

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1.0 INTRODUCTION

This Pollution Prevention (P2) Plan was prepared for Texas Woman's University – Denton Campus (TWU) in order to comply with the Waste Reduction Policy Act of 1991. This statute requires generators of hazardous wastes (large and small quantity) to prepare a P2 plan every five years, at least. This plan includes the components required by the Texas Commission of Environmental Quality in 30 TAC 335 Subchapter Q – Pollution Prevention: Source Reduction and Waste Minimization. Our last P2 Plan was from 2018 to 2022, however we are using a base year of 2021 for wastes since the new plan is due by January 1, 2023 and 2022 is not over yet. Therefore, we do not have total numbers for 2022 to use since this is due prior to the year being over.

1.1 FACILITY DESCRIPTION

Texas Woman's University was founded by the 27th Legislature in 1901 as the Girls Industrial College. The school's name was changed to Texas Woman's University in 1957. From its inception the school has had a dual mission: to provide a liberal education and to prepare young women "for the practical industries of the age" with a specialized education. Men have been admitted to TWU since 1972.

TWU currently offers a comprehensive catalog of academic studies, including baccalaureate, masters and doctoral degrees. TWU is the largest university primarily for women in the United States, with its main campus in Denton and Institutes of Health Science in Dallas and Houston Texas.

The main campus is located in the City of Denton, Denton County, Texas; a town of about 148,000 people located about 42 miles north of Dallas and Fort Worth. The main campus has over 60 buildings on approximately 240 acres. Total TWU student enrollment is approximately 16,000 including Dallas and Houston campuses. TWU employs approximately 1850 staff, faculty and administrative employees.

The main campus is self-supporting, and is typical of many traditional campuses in that it provides for faculty administration and staff offices, educational spaces (i.e. classrooms, laboratories), student housing and a dining facility, athletics and sporting venues, research spaces and campus security. TWU is accessible from Interstate 35E, US 377/US 380 and surrounding city streets.

The university generates hazardous and non-hazardous waste from various maintenance activities as well as routine laboratory and studio practices. The Denton campus is registered with the Environmental Protection Agency (EPA) and the Texas Commission on Environmental Quality (TCEQ) as a small quantity non-industrial generator. The Texas solid waste registration number is 88846 and the EPA I.D. number is TXR000079816.

1.2 POINT-OF-CONTACT

The point of contact for the P2 Plan is Drew Townsend, Director of Environmental Health & Safety. Phone: 940-898-3129. Email: Atownsend4@twu.edu

1.3 SOURCES OF HAZARDOUS WASTE GENERATION

Hazardous wastes are generated as a result of teaching, research and operational activities at the university. Environmental Health & Safety (EHS) is responsible for proper handling and ultimate disposal of these wastes. RCRA hazardous wastes are primarily generated in the following departments:

- 1 Facilities Management and Construction
- 2 Visual Arts Department
- 3 Chemistry & Biochemistry Department
- 4 Biology Department
- 5 Nutrition & Food Science Department
- 6 Dental Hygiene Department
- 7 Central Plant (Heating & Cooling)
- 8 Student Health Services
- 9 Theater Department

The main hazardous wastes are generated by academic departments through their teaching and research activities. This includes 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 ([Guidelines for the Classification and Coding of Industrial and Hazardous Wastes](#), RG-22). The vast majority of wastes are small quantities of lab-pack wastes due the unique nature of each respective research laboratory. The waste codes are included on the TCEQ Notice of Registration (NOR) for the Denton campus.

In addition, TWU also generates universal waste bulbs and paint and paint related wastes. The main generator of this is the Facilities Management and Construction Department.

1.4 WASTE IDENTIFICATION/WASTE VOLUME

Table 1 lists the hazardous and universal wastes at the University and the amount generated during 2021, the base year for this plan. The hazardous waste is managed by permitted treatment, storage and disposal facilities (TSDF). The waste streams shown in bold are those targeted for reduction. These waste streams will be targeted for reduction by the University and addressed by this plan. Because the University's SIC code is 8221, emissions reports under SARA Section 313 Toxic Release Inventory (TRI) are not required. This plan addresses hazardous and universal waste reduction only.

1.5 COMMITMENT TO THE ENVIRONMENT

Texas Woman's University will continue to maintain environmental responsibility and compliance to regulatory requirements as a top priority. The university's Environmental Health & Safety regulation and policy (URP No. 04.430) specifically states that the university shall endeavor to comply with the intent of appropriate federal and state regulations. This policy is signed by the university Chancellor and President.

1.6 INFORMATION ON ENVIRONMENTAL AND HUMAN HEALTH RISKS

Given the ever-changing, and diverse nature of the different kind of wastes generated on campus, it is not possible to easily summarize the environmental and human health risks of all of the wastes in order to determine reduction goals. Furthermore, all hazardous wastes, by their very nature of being designated as such, have some sort of environmental or human health risk. Therefore, the primary reduction goal generally will be our largest waste stream of lab pack wastes from laboratories. However, within the lab pack waste stream a priority will be given, where possible, to reducing particularly hazardous substances (carcinogens, reproductive toxins, and acutely toxic materials) and items with greater environmental impacts (heavy metals etc.). TWU maintains an online Safety Data Sheet (SDS) repository for all chemicals on campus where hazard information is consulted for assessing risk and aiding in this decision making processes. In addition to the lab pack waste stream, the second reduction goal will be fluorescent light bulbs. Fluorescent light bulbs contain mercury vapor. Mercury vapor can affect the nervous system and kidneys, can be a reproductive toxin, and is generally poisonous.

1.7 EMPLOYEE AWARENESS AND TRAINING

Employees who conduct tasks that result in hazardous or universal waste generation are trained to increase awareness of the environmental policy of pollution prevention and reduction. This training is included in TWU's Hazardous/Regulated Waste Management training conducted in both classroom sessions and via TWU's online learning management system Bridge. References to the training requirement will also be made in other training sessions that apply to employees who work with hazardous waste (e.g. the Chemical Hygiene Plan/Laboratory Safety training).

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 pollution prevention 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 five year P2 Plan period. These projects are designed to reduce the bolded waste streams identified in **Table 1**. These proposed projects are described in more detail below and listed in **Table 2**.

Product Substitution

Substitution of less toxic or hazardous materials will result in smaller volumes of hazardous waste requiring disposal. Risk Management will work with various departments on campus to make them aware of this effort and to assist with the identification of appropriate substitutions. Several departments, including Facilities Management & Construction, Chemistry & Biochemistry and the Visual Arts department have already begun independent efforts toward this goal.

The Chemistry & Biochemistry department has embraced a “green chemistry” approach in an effort to reduce their environmental impact and reduce health and safety risk to their students and employees.

Facilities Management & Construction is always looking for ways to reduce the environmental impact of its operations; for example much of its solvent waste has been eliminated by switching to latex-based paints wherever possible which do not require solvents for cleanup. Furthermore, they have recently replaced fluorescent bulbs with LED bulbs in many buildings. This process will continue, and all new construction will have LED bulbs.

Examples of substitutions that have been effective at other universities in laboratory settings include:

- 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.

EHS will make a webpage of chemical substitutions that can be made for common laboratory research procedures.

Enhance Chemical Reallocation/Reuse

This was formerly known as the “Chem Swap Program,” but it has been revamped with the construction of a new building. The intent with this is to reduce the amount of unused commercial chemical product disposed of. These unused products typically are generated from laboratory cleanouts, stockroom cleanouts, or research laboratory decommissioning. According to the definition of solid waste in RCRA, unused commercial chemical products are only a waste when discarded. Use of these chemicals rather than disposal keeps them from being classified as hazardous waste and avoids unnecessary disposal when still viable. This program allows laboratory faculty and staff to obtain, free of charge, unused chemicals donated by other lab users or diverted from the waste stream by EHS staff. The basic components of this program are:

- EHS identifies chemicals that can be reused/reallocated when doing lab cleanouts and inspections of laboratories and moves them to stockroom in SRC.
- All chemicals available for reuse are maintained in chemical inventory for all professors to see.
- Only TWU professors or laboratory technicians can request the chemical (unqualified employees, students or other non-employees may not).
- Labels must be in good condition and the shelf life of the material must be good.
- If a department wants a chemical, they contact EHS and 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 program.
- The service is free to the chemical provider and free to the chemical receiver.

The enhancement from previous iterations of the program will be the increased promotion through routine emails, identifying chemicals during inspections, posting of flyers in laboratory buildings, and maintenance of the online inventory. This will increase participation, thereby reducing disposal of unused chemical products that are still viable.

Source Reduction

A new laboratory research facility was constructed and opened in spring of 2021. The new facility has a central stockroom which is shared amongst all researchers in the building. This enables the researchers in the building to buy and share common laboratory chemicals, rather than each buying their own separate containers. This can reduce the quantity of new chemicals purchased on an ongoing basis, leading to fewer expired or un-needed chemicals to be disposed of as laboratories are cleaned out, research interests change, materials expire, etc.

Implement an Environmental Management System (EMS)

Implementation of a formal EMS will contribute further to the reduction of hazardous waste generated in general by identifying future reduction goals and associated pollution prevention projects with upper management participation.

2.2 SCHEDULE OF IMPLEMENTATION AND MEASURABLE GOALS

The proposed schedule of implementation for these projects is listed in **Table 3**, although given the nature of University waste generation (as opposed to an industrial generator), the implementation will be ongoing. The schedule covers the period of time from 2023 to 2027. The University is dedicated to reduce the volume of hazardous waste by 10%, relative to enrollment and research funding, over the next five years. The base year for this assessment is the year 2021 and the annual waste amounts will compare to this baseline to determine if the reduction goals are being met.

2.3 CERTIFICATE OF COMPLETION

This document certifies that the Pollution Prevention 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 335 Subchapter Q – Pollution Prevention: Source Reduction and Waste Minimization, 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 resources necessary to implement the plan.

Name: Matt Moustakas

Title: Executive Director of Risk Management

Signature: _____

Date: _____

Pollution Prevention Plan - Tables

Table 1. Hazardous Wastes Generated

TCEQ Waste Code	Waste Description	EPA Waste Codes	2021 Generation (lbs)
0001001H*	Lab packs of various waste and unused chemicals and materials from teaching and research laboratories and art studios.	D001 D002 D003 D004 D005 D006 D007 D008 D010 D011 D012 D013 D014 D015 D016 D019 D022 D028 D035 D036 D038 D039 F001 F002 F003 F005 P030 P042 P051 P067 P075 P087 P093 P098 P105 P106 P123 U001 U002 U003 U007 U012 U020 U031 U044 U056 U061 U080 U089 U103 U117 U122 U123 U129 U138 U140 U142 U147 U148 U154 U170 U188 U190 U196 U210 U211 U213 U220 U239 U240 U247 U404	1266
0002105H*	Waste acids from teaching and research laboratories.	D002	0
0003203H*	Waste solvents primarily from teaching and research laboratories.	D001 D022 F003 F005 U044 U117	2071
0004211H	Petroleum distillates/solvents from various campus activities including facilities maintenance and educational/research activities.	D001 F003 F005	0
0005319H	Lead containing aprons, foil, shields, and bite wigs from the teaching dental clinic on campus.	D008	0
0011119H	Silver bearing fixer waste generated from photographic development processes onsite.	D011	0

TCEQ Waste Code	Waste Description	EPA Waste Codes	2021 Generation (lbs)
0026519H	Sludge/Water removed from sump pit containing lead	D008	0
0025319H	Lead-containing equipment/building materials	D008	0
0017119H	Waste Liquid RCRA Pesticides (Fertilizer/Herbicide/Pesticide)	D001 D004 D010 D012 D016 D018 F003 P001 P012 P024 P037 P071 P089 P108	0
0019113H*	Liquid and semi-solid waste from the educational ceramics department.	D005 D006 D007 D008 D010 D011	200
0020801H	Organic gasses from laboratories on campus.	D001	0
0021701H	Non-flammable gasses from laboratories on campus.	D002	0
0024110H	Caustic Wastes Including Old Pool Chemicals	D002	0
Universal (NA)	Universal Waste Bulbs	NA	4149 Bulbs

Notes: * Indicates waste was generated during the base year. Other wastes are active on NOR, yet generated only sporadically.

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

The order of priority for reduction is the order listed in the table: 0001001H, then 0003203H, then Universal Waste Bulbs.

Table 2. Proposed Source Reduction/Waste Minimization Projects

Source Reduction Activity	Resulting Waste Eliminated or Reduced
1. Product Substitution	Lab packs of various waste and unused chemicals and materials from teaching and research laboratories (0001001H)
2. Enhance Chemical Reallocation/Reuse	- Lab packs of various waste and unused chemicals and materials from teaching and research laboratories (0001001H) - Waste solvents primarily from teaching and research laboratories (0003203H)
3. Implement Environmental Management System (EMS)	Implementation of a formal EMS will contribute further to the reduction of hazardous waste generated in general by identifying future reduction goals and associated pollution prevention projects with upper management participation.
4. Source Reduction	- Lab packs of various waste and unused chemicals and materials from teaching and research laboratories (0001001H) - Waste solvents primarily from teaching and research laboratories (0003203H)
5. Product Substitution	Universal Waste Bulbs

Table 3. Schedule of Implementation and Measurable Goals

Source Reduction Activity	Schedule of Implementation
1. Product Substitution	Product substitution efforts for lab chemicals are ongoing, and will continue throughout the 2023-2027 term of this plan. EHS will identify significant contributors to the Lab Pack waste stream and work with other departments to find substitute materials. The hazardous waste training required for employees generating such waste includes discussion of this plan and the requirement under this project to substitute less hazardous products whenever possible. EHS will develop a web page with common substitutes in research lab settings by end of FY 23. Furthermore, old fluorescent light bulbs are being phased out across campus and replaced with LED lights. We have done this in numerous buildings, but will continue to over the next 5 years. Specifically, Jones Hall and Brackenridge buildings will be renovated and all lights will be LED. Jones Hall will be done in 2023, and Brackenridge done in 2024.
2. Enhance Chemical Reallocation/Reuse	Enhance the reallocation/sharing of chemicals (formerly known as the Chem Swap program) through increased promotion of chemicals that are available for use. Furthermore, we will work to create a PI "Offboarding" program where we will go through their leftover chemicals prior to their exit to identify those chemicals that can be reallocated to other researchers instead of disposing of them. A new research building was completed and it houses central chemical storage room where surplus chemicals are stored. This allows chemicals to be put into the Chem Swap program, rather than be disposed of. Promotion will be continuous throughout the five year plan.

3. Implement Environmental Management System (EMS)	Development of written EMS procedures and policies is ongoing. Full implementation of program to be completed by the end of 2023. One goal of the EMS system is reduction of hazardous waste in general across campus, relative to growth in enrollment.
4. Source Reduction	A new laboratory research facility has opened with a central stockroom which enables chemical sharing. This will reduce the amount of new chemicals purchased on an ongoing basis, leading to fewer expired or un-needed chemicals to be disposed of. The stockroom functionality will be promoted during inspections, PI onboarding, and outreach events. This will be continuous throughout the five year plan.