

Pollution Prevention Plan

2018-2023

I. Facility

This plan applies to the Texas A&M University Campus Facilities and Research University for main campus in Brazos County. It enrolls approximately 66,000 students, spans 5200 acres, and conducts more than \$650 million in research annually. Included is the Texas Engineering Extension Service's (TEEX) and Brayton Fire Training Field. This facility trains over four thousand firefighters and emergency personnel using hands-on training in structural firefighting, passenger train emergency response, structural collapse rescue, and other mass casualty emergencies.

In support of its commitment to prevention of pollution on campus, Texas A&M University continually strives for increased efficiency of processes, reduced volume of waste, and constant improvement of waste management. Texas A&M University currently utilizes an Environmental Management System (EMS) to assist in reaching these goals. Texas A&M University has formed the Sustainability and Environmental Management Committee to recommend improvements to environmental programs throughout the University.

II. Processes Generating Hazardous Waste

There are approximately 4,500 education, research, and support laboratories on the Texas A&M University campus. Typically, each lab will contain numerous processes working simultaneously. Due to the small amount of waste generally produced by individual laboratory processes and the impracticality of listing each process, this program will take advantage of the similarities in laboratory management and (with a few exceptions) treat laboratories as a single process.

In support of the education and research mission, Texas A&M University has a variety of processes and sources for hazardous waste. These include utilities (power, domestic water, storm water, and waste water), facility maintenance, custodial operations, grounds maintenance, fleet maintenance and fueling, and airport operations (maintenance and fueling).

The following table shows all waste streams producing more than 1,000 lbs. waste in 2016.

Major Waste Stream	Texas Waste Code	Weight (lbs.) 2016
Halogenated and non-halogenated waste	0002204H	79990
Contaminated Laboratory Debris	0021407H	8300
Lab Packs with No Acute Hazards	0003003H	5986
Spent Acids with Metals	0001103H	4800
Non-Halogenated Organic Salts	0014409H	1706
Caustic Aqueous Solution	0007110H	1600

As shown in the table, hazardous waste from Texas A&M University is in excess of 50% solvents. Furthermore, laboratories produce about 80% of all hazardous waste on campus.

III. Prioritized List of Pollution Prevention Projects

a. Source Reduction

- i.** Alter methods and patterns of purchasing in laboratories.
- ii.** Improve laboratory chemical inventories.
- iii.** Encourage more environmentally sound lab practices.
- iv.** Improve and expand Environmental Management System (EMS).

b. Waste Reduction

- i.** Increase recycling and reuse.
- ii.** Decrease amount of non-hazardous waste being disposed of as hazardous waste.
- iii.** Reduce cylinder disposal by returning cylinders to manufacturers.
- iv.** Implement elemental neutralization process.

IV. Explanation of Pollution Prevention Projects

a. Source reduction

- i.** Investigate the feasibility of developing a purchasing process for laboratories. An effective campus wide purchasing and distributing system could reduce the amount of excess chemicals that would later be submitted as waste.

- ii. To prevent retention of outdated chemicals, unnecessary purchases, and accumulation of chemicals used in processes that no longer exist; laboratories will be encouraged to perform a yearly inventory of stock. This will be accomplished through Laboratory Safety Training (provided by EHS), written guidance documents on the EHS website, and in the EHS Safety Dispatch Newsletter.
- iii. Encourage environmentally sound lab practices such as reduction in scale, use of non-hazardous chemicals where possible, encourage laboratory personnel to consider the life cycle of the chemicals used in labs. This will be accomplished through Lab Safety Training (provided by EHS), the EHS website, the Safety Dispatch newsletter, and with assistance from the Department Safety Officers,
- iv. Continued development of the EMS can improve the ability to effect changes that will reduce sources of waste material. An effective EMS can provide improved communication with faculty and staff, and provide administrative support on environmental issues.
- v. Laboratories are often faced with disposing of unused chemicals. Attempts to create an on campus chemical exchange program in the past have been met with logistical struggles. These issues may be corrected by encouraging the individual Department Safety Officers to set-up internal chemical exchange programs.

b. Waste Minimization

- i. Encourage the development of a purchasing process that will in turn reduce the purchase of excess chemicals, which later are discarded as waste. For example, common solvents, Texas A&M University's largest waste stream, can be purchased in bulk and distributed in volumes as needed. The current method of procurement may encourage the researcher to purchase in volumes greater than required and dispose of the excess.
- ii. Especially during laboratory clean-outs, chemicals that should not be considered hazardous waste get disposed of as hazardous waste. This can often be caused by lack of knowledge by persons cleaning the lab or by unlabeled material. By working with facility managers and Department Safety Officers, implementing the University's Lab Closure Procedure can reduce the amount of waste unnecessarily generated from decommissioned laboratories and laboratory relocations. Further reductions can be obtained by having qualified personnel review the waste prior to submittal for disposal.

- iii. Many cylinders are unnecessarily disposed of as hazardous waste every year. By taking advantage of companies that will accept the return of empty or partially filled cylinders, this number could be significantly reduced. This is particularly the case with small lecture cylinders.
- iv. A notable volume of corrosive waste is currently handled as hazardous waste. Through elemental neutralization much of this waste could be disposed of as non-hazardous.
- v. Continue to expand the recycling programs by incorporating more materials eligible for recycling. Increased participation can be gained through education via pamphlets, The Safety Dispatch, and Laboratory Training.

V. Anticipated Reduction

Texas A&M University is currently at the pinnacle of growth with several large research buildings completed recently. The processes in these facilities reflect a noticeable increase in the number of laboratories that produce hazardous waste on campus. As it is expected that the total volume of hazardous waste will increase, the effectiveness of this plan must be measured by metrics that take this into consideration.

- i. A 10% increase in non-hazardous waste removed from hazardous waste disposal program annually thru 2023.
- ii. Benchmark elemental neutralization in 2018, followed by increases of:
 - a. 25% in 2019
 - b. 15% in 2020
 - c. 10% in 2021
 - d. 5% in 2022 and 2023
- iii. Increase in gas cylinder returns 5% annually.
- iv. Increase recycling 10% annually through 2023.

VI. Texas A&M University Goals

The goal of Texas A&M University is to continuously seek methods to reduce quantity and cost of hazardous waste while taking particular care to support the mission of the University.

VII. Employee Awareness Program

Source reduction/waste minimization training is a fundamental responsibility of Texas A&M University for all students, faculty, and staff who potentially generate hazardous

waste. Appropriate training will be available to all employees and students in laboratories, shops, kitchens, offices, or other workplaces where hazardous waste is generated. The training and information will be 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 laboratory involving hazardous waste generation. Texas A&M University Environmental Health and Safety 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:

- i.** Regulations and laws effecting pollution prevention and hazardous waste generation;
- ii.** Personal protective equipment;
- iii.** Hazard materials and hazardous waste;
 - a. Proper storage;
 - b. Safe and proper handling;
 - c. Disposal/recycling;
 - d. Transportation:
- iv.** Inventory tracking;
- v.** Acquisition of hazardous materials;
- vi.** Substitution/elimination of hazardous materials; and
- vii.** Economic/environmental ramifications of hazardous waste generation and disposal.