

**UNIVERSITY OF HOUSTON
ENVIRONMENTAL HEALTH AND SAFETY
POLICIES AND PROCEDURES**

SECTION: ENVIRONMENTAL HEALTH AND SAFETY

**SUBJECT: CHEMICAL RECYCLING AND WASTE MINIMIZATION
PROCEDURES**

I. BACKGROUND

The University of Houston is a large and diverse scientific research facility which uses many different chemical substances on a daily basis. Unfortunately many of these substances have to be discarded and end up as waste. Currently the University is classified as a large quantity generator under the hazardous waste rules and is subject to all applicable requirements. This is a sizeable undertaking for the Environmental Health and Safety Department (EHS) staff. In addition, chemical waste disposal currently costs the University over \$100,000 per year. There is no long term investment in waste disposal costs for the University other than a demonstration of regulatory compliance. Therefore it is the best interests of the University to recycle, reduce, and reuse (*Example: minimize waste*) whenever possible so that these funds could be spent on more worthwhile projects.

In addition, the Texas Commission on Environmental Quality (TCEQ) under the direction of the Environmental Protection Agency (EPA) has promulgated rules which require large quantity hazardous waste generators such as the University to develop plans to either eliminate the source of the hazardous waste (called source reduction) or minimize the quantity of hazardous waste (called waste minimization). The University submitted a source reduction/waste minimization plan as required by the regulations, but any additional efforts from UH community members to reduce waste (of any type) would be a positive step.

II. PURPOSE

The purpose of this procedures document is two-fold. The first goal is to raise general awareness of potential recycling and waste reduction projects that could be implemented in individual departments. The second goal is promote the University's chemical exchange (CHEM-SWAP) program. This program is geared to reduce chemical wastes, which are frequently classified as hazardous waste, and cost the University a great deal of money and time to dispose of in accordance with regulatory requirements.

III. GENERAL RECYCLE AND MINIMIZATION PROCEDURES

Each individual department and college is encouraged to pursue recycling and waste minimization projects for their areas. The TCEQ has some general ideas for some more common industries and types of operations. These sites can be accessed at <http://www.tceq.texas.gov/p2/P2Recycle/wrpa/p2resources.html>

Remember the 3 R's when developing waste minimization plans:

Reduce – use smaller amounts of ingredients (chemicals) wherever possible

Reuse – transfer unused portions of chemicals between areas or save for later use

Recycle – reuse chemicals by installing filtration or distillation units

Consider using *less hazardous* alternatives than currently used chemicals in specific processes or research procedures.

If possible, avoid adding extraneous ingredients such as emulsifiers or coolants to solvents or solvent wastes. Segregate different types of solvents for potential reuse and recycle. Laboratories generate a substantial amount of waste at the University. Presented below are some general laboratory waste minimization suggestions.

Types of Experiments	Instead of ...	Use...
Quantitative test for halide ions	Carbon tetrachloride	Cyclohexane
<input type="checkbox"/> Phase change <input type="checkbox"/> Freezing point depression	Stearic acid	Acetamide
Glassware cleaning	Chromic sulfuric acid solutions or alcoholic potassium hydroxide	<input type="checkbox"/> Potassium hydroxide <input type="checkbox"/> Sonic baths <input type="checkbox"/> Specialty solvents
High temperature measurements (for lower temperatures a less expensive alcohol thermometer will suffice)	Mercury thermometers	Digital thermometer/thermocouple
Acid/base experiments	Hazardous acids/bases	Vinegar/Ammonia

IV. CHEM SWAP PROCEDURES

The CHEM-SWAP Program is designed to help reduce the amount of chemical waste, which frequently is classified as hazardous waste per the EPA rules, by promoting the swapping of chemicals for additional use by others instead of disposal. The program is open to all members of the University who may have a chemical or chemicals that may be used by someone else within the University. Participation is easy, just follow these steps:

1. Download and print out a CHEM-SWAP Form Figure 1 on Page 4 of this policy
2. Fill out the top portion with as much detail about the specific chemical or chemicals to swap as possible
3. Mail the form via inter-office mail to EHS Mail Code 1005 or fax to 3-8035
4. Check the EHS website for available chemicals for swap

V. REFERENCES

Title 31, Texas Administrative Code (TAC), Texas Environmental Regulations, (Texas Commission on Environmental Quality), most recent edition.

Title 40, Code of Federal Regulations, Protection of the Environment, (US Environmental Protection Agency), most recent edition.

