Comprehensive Pollution Prevention Programs in a Dynamic University Laboratory Setting

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Abstract

The education, research, and patient care goals of universities in Texas mandate prudent management of environmental effluents. These effluents may take the form of air/water emissions, hazardous waste, medical waste, or even surplus equipment. The dynamic university laboratory setting requires strong environmental management support, written procedures, faculty/staff/student training, and periodic monitoring programs. This session will discuss best management practices (BMPs) and pollution prevention programs which have been successfully implemented in the university setting. Ideas for improving hazardous waste management training, reusing laboratory chemicals, laboratory monitoring programs, and disposal programs are provided. Attendees will have the opportunity to ask questions and exchange environmental solutions with the speaker.

Speaker Biography

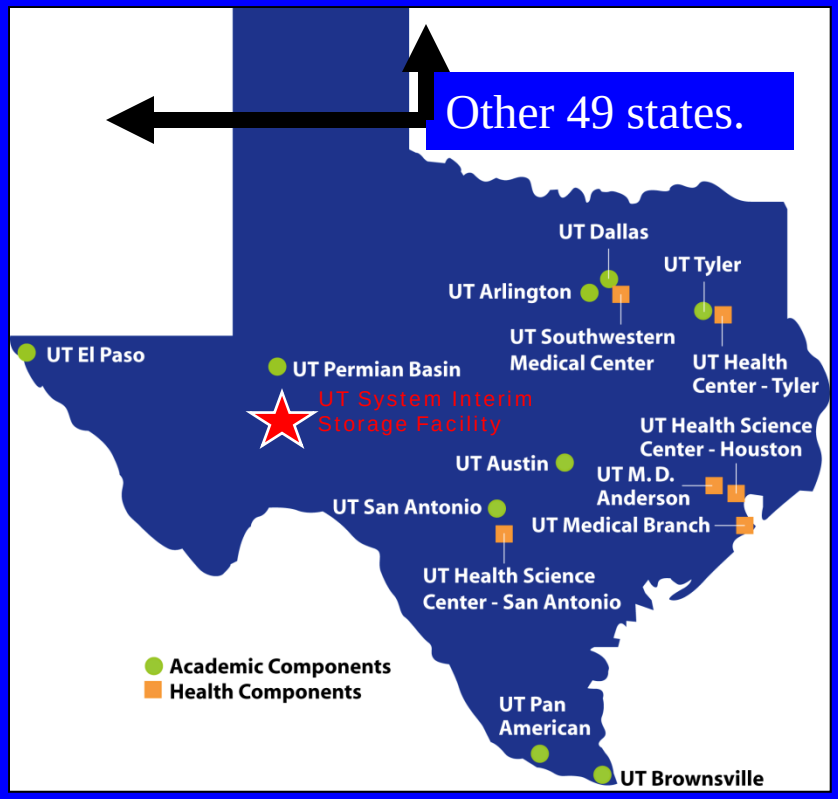
Dr. Michael Charlton is the Assistant Vice President for Risk Management & Safety for The University of Texas Health Science Center at San Antonio and Adjunct Associate Professor for the Radiological Sciences Program in the Department of Radiology. Mike has 14 years of experience in the field of health & safety and holds masters degrees in both health physics and industrial hygiene/occupational health. Mike possesses board certifications in the primary fields affecting health and safety in the research and clinical environment;

Mike has collaborated with an array of environmental health & safety programs, including participation on the City of San Antonio Community Health Environmental Coalition. Mike may be reached at (210) 567-2955 or charlton@uthscsa.edu

Purpose

- ☑ Review current pollution prevention initiatives
- ☑ Describe efforts to enhance training
- ☑ Discuss the UT mercury exchange pilot project
- ☑ Emphasize the added value of waste prevention/management practices
- ☑ State things that can be implemented at your facility

The University of Texas System



- ☑ Founded in 1876
- ☑ Fifteen component universities stretching statewide
- ☑ 170,000 students (36% of all students and 74% of health-related students)
- ☑ $1.4B in research spending
- ☑ #1 ranked cancer center

Hazardous Materials in Education, Research and Healthcare

Image: W.C. Roentgen, 1896

- ☑ Fundamental for biomedical research & analysis
- ☑ Powerful tool for imaging and diagnosis
- ☑ Therapeutic treatments
- ☑ Small, distributed volumes of materials

Continuous Prudent Management

- ☑ Prudent waste management is a continuous process
- ☑ UT emphasizes:
  - Peer protocol review
  - Source substitution
  - Training
  - Workplace Surveys
  - Annual Mgmt Review
  - Waste Mgmt Practices
  - Disposal

Peer Protocol Review Example

- Radiation Safety Committee (RSC) is comprised of peer faculty
- RSC provides an independent peer review on the safe receipt, use, storage, and ultimate disposal of ionizing radiation sources
- Parameters Evaluated:
  - Societal Benefits
  - Scientific Merit
  - Less hazardous alternatives
  - Training/experience
  - Available facilities
  - Disposal capabilities

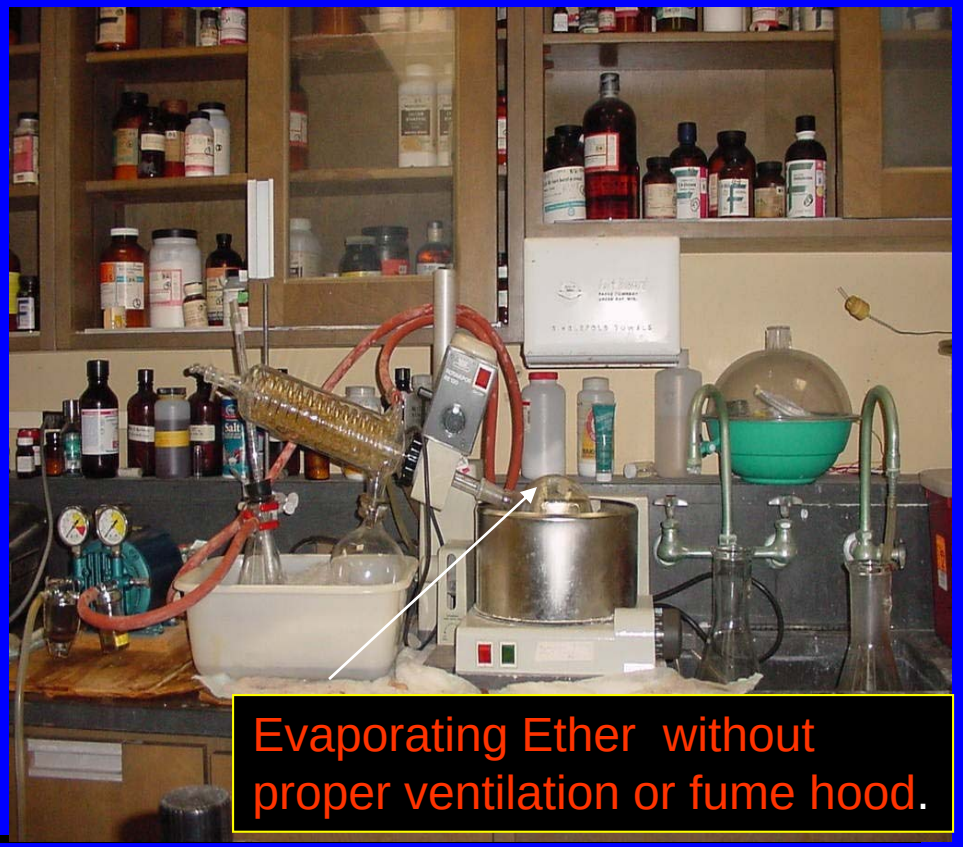
Environmental Health & Safety Oversight

- ☑ Training
- ☑ Comprehensive workplace surveys
  - Risk based surveys
- ☑ Written programs reviewed at least annually
- ☑ Emergency response drills conducted at least annually

Surveys = Pollution Prevention

Chemical waste improperly stored for chemical pickup.

Inappropriate Cap



Evaporating Ether without proper ventilation or fume hood.

Mercury Overview

Environmental Issues with Mercury

- Naturally occurring element, anthropogenic releases
- Ability to “bioaccumulate” in the environment makes it particularly hazardous to animals and humans
- Public health concerns in certain seafood
- Mercury fish advisory for coastal marine waters of the Gulf of Mexico

UT Mercury Hunters

PPIS Grant $51,835

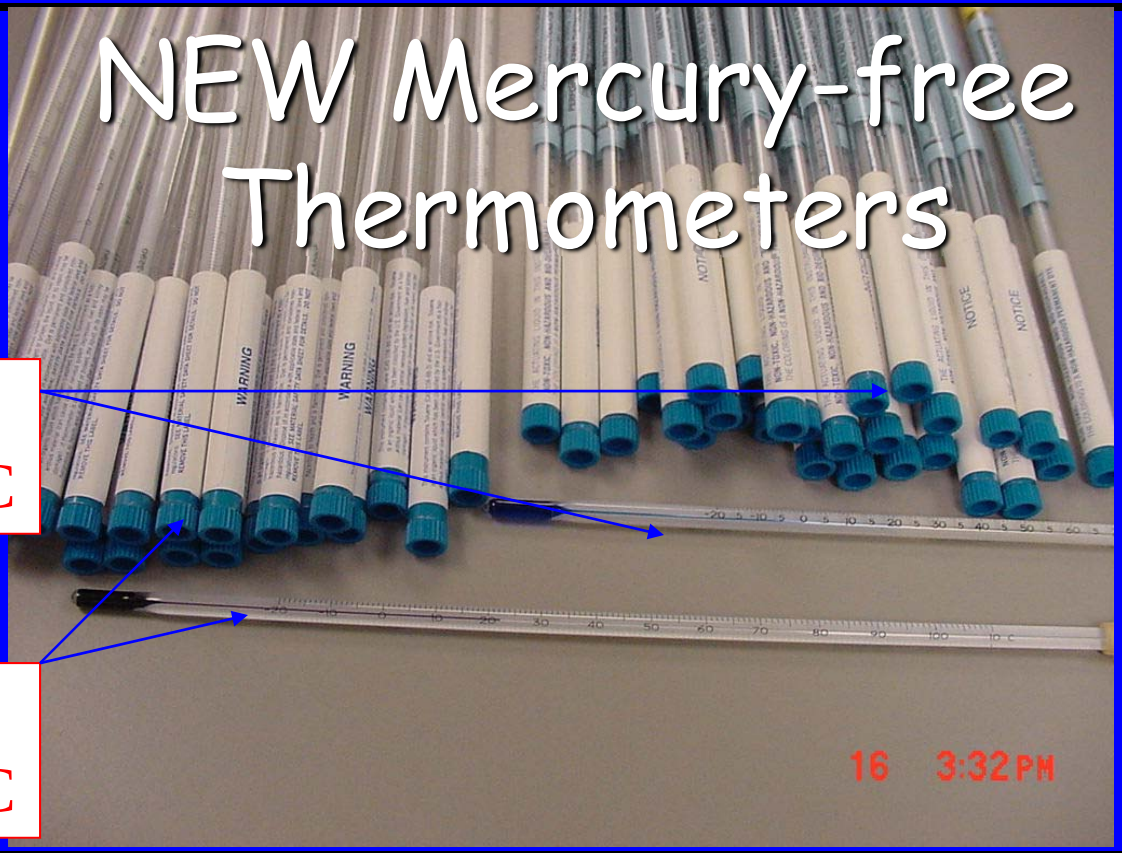
- Component Institution matching fund requirement
- Funding used to purchase laboratory and clinical thermometers, sphygmomanometers, and various physical plant devices
- Demonstration project to compare mercury-bearing devices with mercury-free alternatives
- UTS, EPA, TCEQ, and the P2 Resource Exchange at UT-El Paso to implement statewide mercury awareness program highlighting the findings of the demonstration project
- Share program successes
- Environmentally Preferential Purchasing Policy

Tangible Pollution Prevention

Old Meriam mercury filled manometer with mercury waste bucket at bottom.

New Meriam Hg-free manometer. (Eliminated 5 pounds of Mercury)

Tangible Pollution Prevention



T – 3900S – 20/110C, 0.5C

T--3290 - 20/110C, 1.0C

Dental Mercury Amalgam

- ☑ UTHSCSA top-ranked Dental School (110,000 patients in 2004)
- ☑ Dental amalgam “fillings” contain metals
- ☑ About 50% of the total amalgam mass is Hg
- ☑ Management of amalgam waste significant issue

Dental Mercury Amalgam

- ☑ Implemented a program to control amalgam effluents
- ☑ Amalgam wastes
  - Unused materials
  - Patient contacted
  - Non-contacted materials
  - Suction line traps
- ☑ Installed the first comprehensive system for removing Hg in water
- ☑ Hg recycled by vendor

Hazardous Waste Management
Chemical Reuse

- ☑ Assume we cannot avoid or prevent all waste products
- ☑ Process knowledge enables reuse, recycling, and return
- ☑ Significant inter-laboratory variability

Proactive programs enabled this source to be reused at UTHSCSA for an instrument calibration.

What can you do?

- ☑ Start a laboratory safety survey program
- ☑ Sponsor a laboratory training program
- ☑ Reuse unopened chemicals where possible
- ☑ Implement a mercury reduction campaign
- ☑ Replace older Hg thermometers and pressure devices

Summary

- ☑ The use of hazardous materials is vital in world-class education, research, and patient care.
- ☑ UT has taken an integrated approach to pollution prevention and hazardous waste management.
- ☑ Partnering with the regulatory agencies has been instrumental in preventing pollution in laboratories.
- ☑ Addressing environmental health & safety concerns before issues arise eliminates pollution and hazardous waste.

Questions?

The University of Texas
Health Science Center
At San Antonio