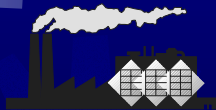


*Hazardous Substances Emergency
Events Surveillance (HSEES)
in Travis County 1993 - 1999*



**Julie Borders, M.S.
Epidemiologist**



Texas Department of Health

HSEES is designed specifically to capture the public health impact of releases like decontamination, evacuation, injury or death





HSEES Objectives

- Describe the distribution and characteristics of emergency events
- Describe the morbidity and mortality resulting from the events
- Identify the risk factors associated with the morbidity and mortality
- Identify strategies aimed at reducing future morbidity and mortality



HSEES Data Collection Form

- Type of Event
- Chemical(s)
 - Identity
 - Chemical Form
 - Type of Release
 - Quantity



HSEES Data Collection Form (continued)

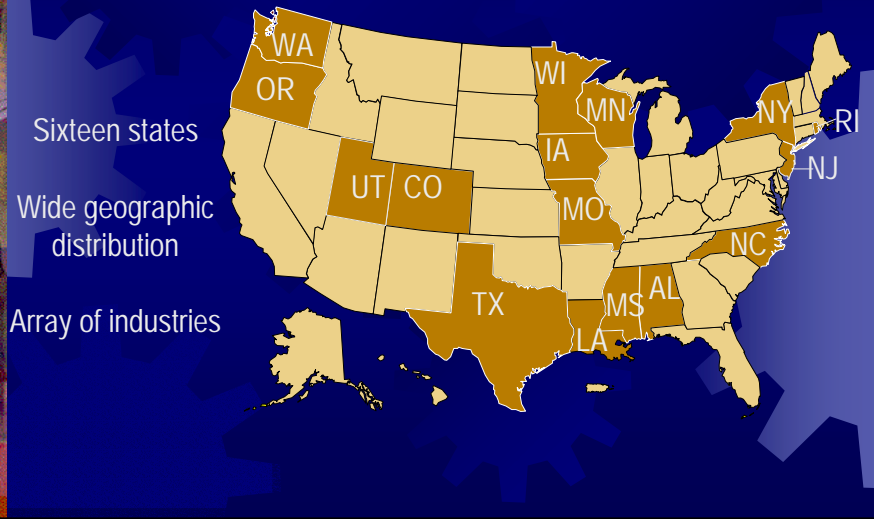
- Victims
 - Population Group
 - Type of Injury
 - Medical Treatment
 - Demographics
 - Personal Protective Equipment
 - Distance From Event



HSEES Data Collection Form (continued)

- Other Information
 - Area
 - Response Plan
 - Time
 - Environmental Sampling
 - Evacuations
 - Causal Factors
 - Affected Population

States Participating in HSEES



Sixteen states
Wide geographic
distribution
Array of industries

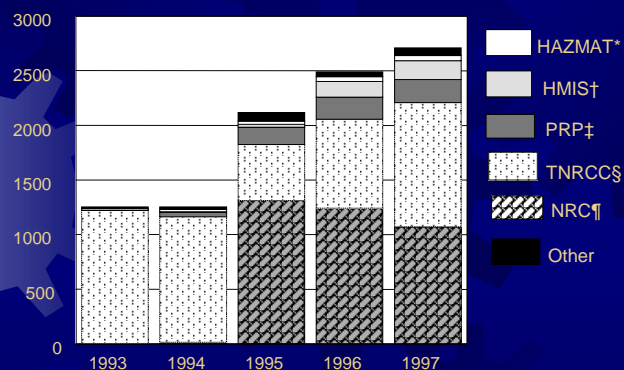
HSEES Criteria for Inclusion:

- Substance released had to be removed, cleaned up, or neutralized according to federal, state, or local law
- A threatened release that would have had to be removed, cleaned up, or neutralized according to federal, state, or local law and the threat led to an action to protect the public health

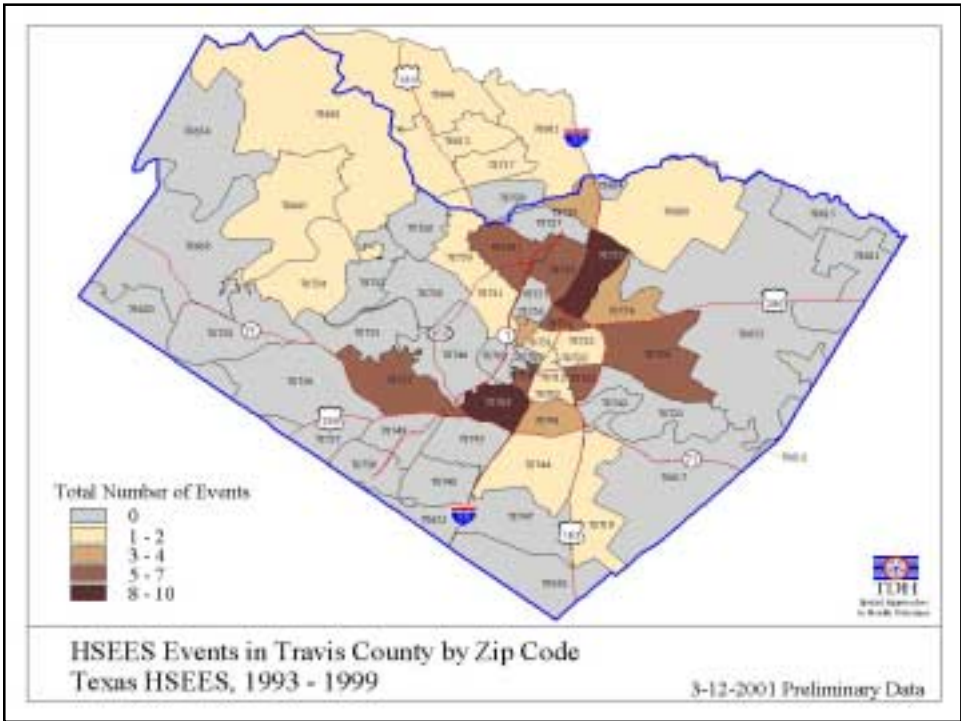
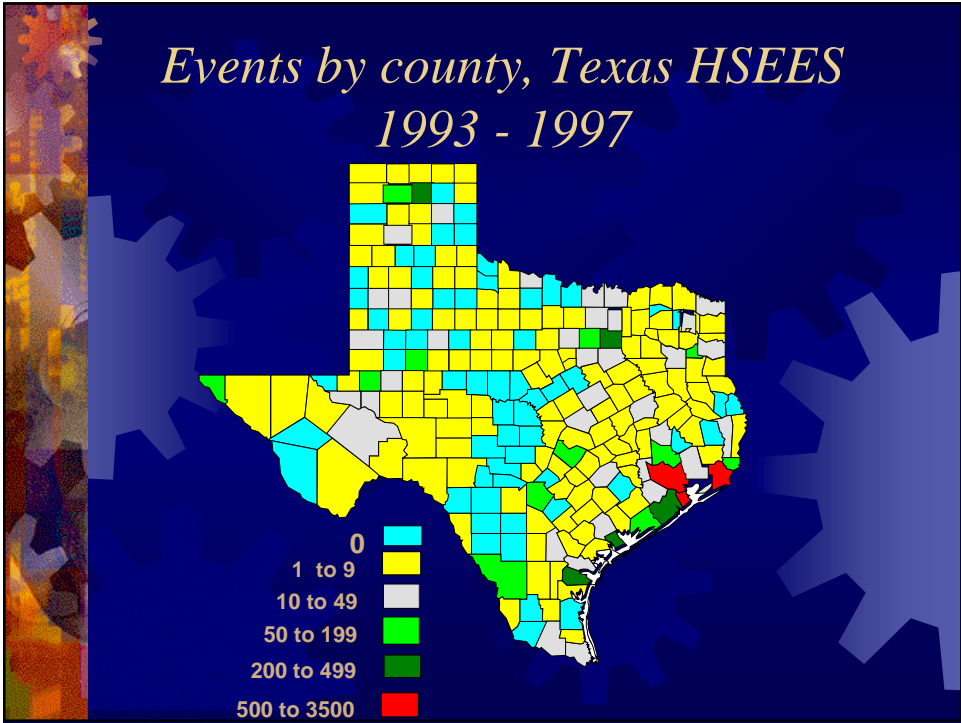
Texas HSEES Case Definition

- Sudden uncontrolled or illegal releases or threatened releases of at least one hazardous substance.
- Events involving only petroleum are excluded.
- The released material must be greater than 1 gallon or 10 pounds or exceed the CERCLA reportable quantity (RQ).

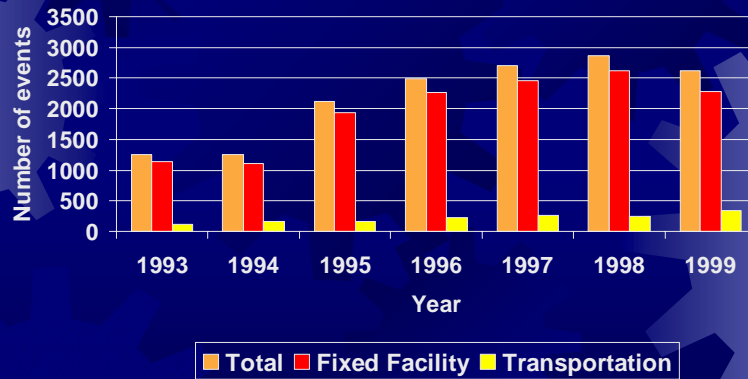
Distribution of Events by Data Source for Texas HSEES, 1993 - 1997



* HAZMAT - Hazardous Materials Unit
 † HMIS - Hazardous Materials Incident System
 ‡ PRP - Primary Responsible Party
 ¶ NRC - National Response Center
 § TNRCC - Texas Natural Resource Conservation Commission

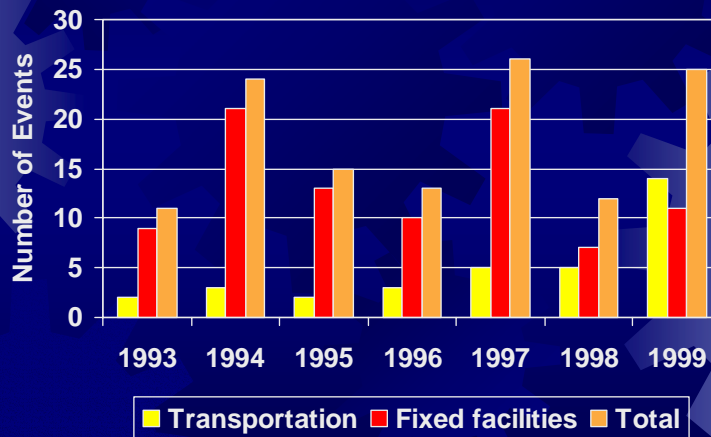


Texas HSEES Events by Year 1993-1999

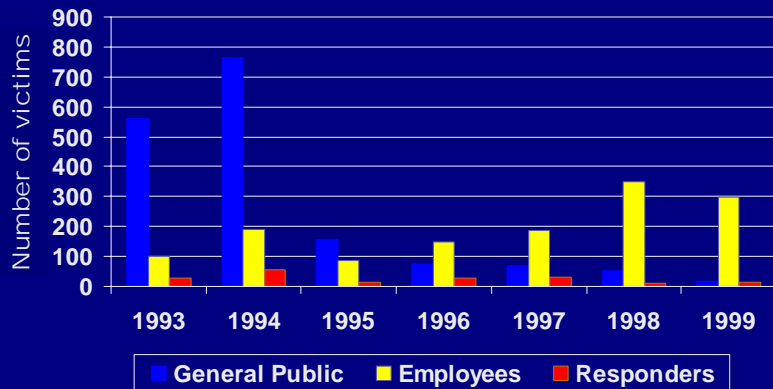


Preliminary Data for 1999

Distribution of Travis County Events 1993 - 1999



Texas Victims* by Year 1993-1999

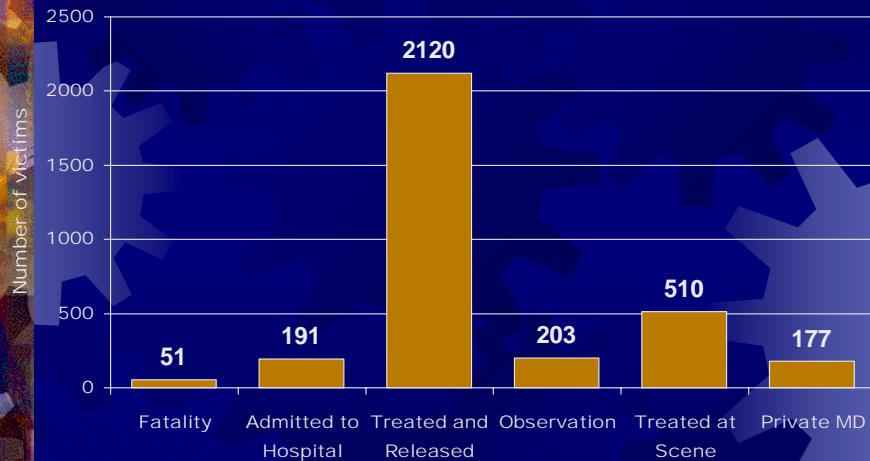


*21 victims were of unknown category.
Preliminary Data for 1999

Texas Victims and Chemicals 1993-1997

- The general public was most frequently injured in events involving ammonia (39%).
- Employees were most frequently injured in events involving other chemicals (18%), other inorganic substances (17%), and the multi-chemical category (17%).
- Responders were most frequently injured in events involving other chemicals (24%), followed by acids (22%), and pesticides (18%).

*Medical Outcomes for Injured Persons in Texas 1993-1999**



Preliminary Data for 1999

*1 person reported by other official

Texas HSEES Data Analysis 1993 - 1999

- The majority of the victims were treated at a hospital and released
- There were no responder fatalities
- There were 51 deaths, 78% were employees and 22% were members of the general public
- 92% of the transportation-related deaths and 65% of the fixed-facility deaths were due to trauma

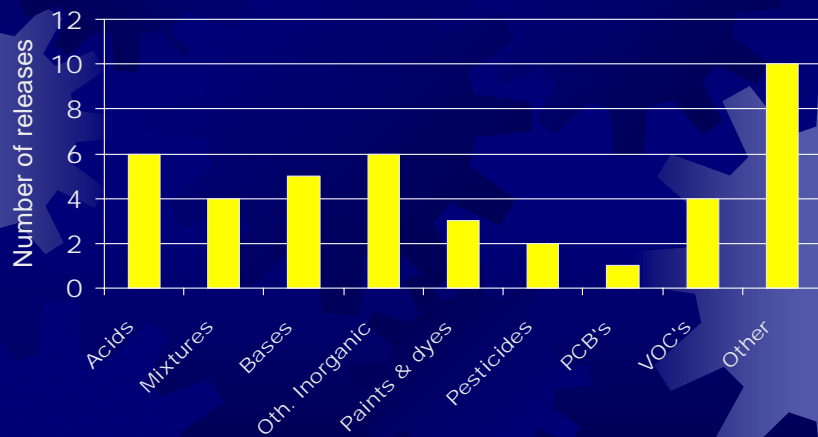
Comparison of Travis County with Statewide Numbers 1993-1999

	Texas	Travis County Number (%)
Total no. of events	15296	126 (0.8%)
Total no. of events with victims	429	16 (3.7%)
Total no. of victims	3253	79 (2.4%)

Comparison of Travis County with Statewide Numbers for Transportation Events 1993-1999

	Texas	Travis County Number (%)
No. of transportation events	1489	34 (2.3%)
No. of transportation events with victims	132	1 (0.8%)
No. of victims from transportation events	462	1 (0.2%)

Number of Chemicals Released in Travis County Transportation Events 1993-1999

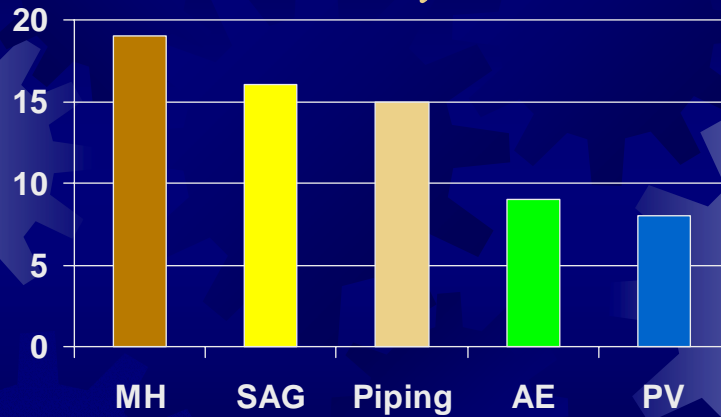


Preliminary Data for 1999

Comparison of Travis County with Statewide Numbers for Fixed-Facility Events 1993-1999

	Texas	Travis County Number (%)
No. of fixed-facility events	13807	92 (0.7%)
No. of fixed-facility events with victims	297	15 (5.1%)
No. of victims for fixed facilities	2791	78 (2.8%)

Most frequent locations in Fixed-Facility Events in Travis County 1993 - 1999



MH = Material Handling, SAG = Storage Above Ground
AE = Ancillary Equipment, PV = Process Vessel

Most frequently identified causes of releases within Travis County 1993-1999

Operator Error was identified in 22 events.

- 7 associated with material handling
- 3 associated with piping
- 3 associated with storage above ground

Equipment Failure was identified in 21 events.

- 5 associated with piping
- 4 associated with material handling
- 3 associated with storage above ground

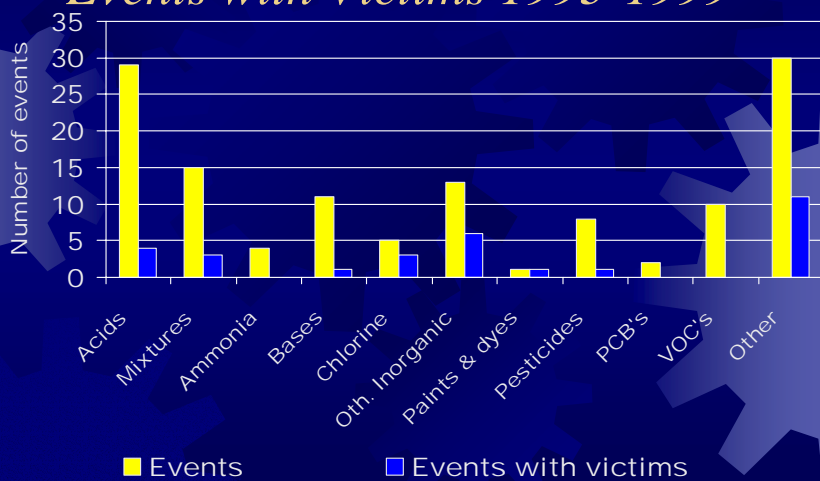
Fixed-facility events involving victims in Travis County 1993-1999

There were 14 events at fixed facilities involving victims.

Operator error was identified as the cause in 4 events.

Storage above ground was identified as the location in 5 events.

Number of Chemicals Released in Travis County Fixed-facility Events and Events with Victims 1993-1999



Preliminary Data for 1999

Some Substances Associated with Fixed-facility Events Involving Victims in Travis County 1993-1999

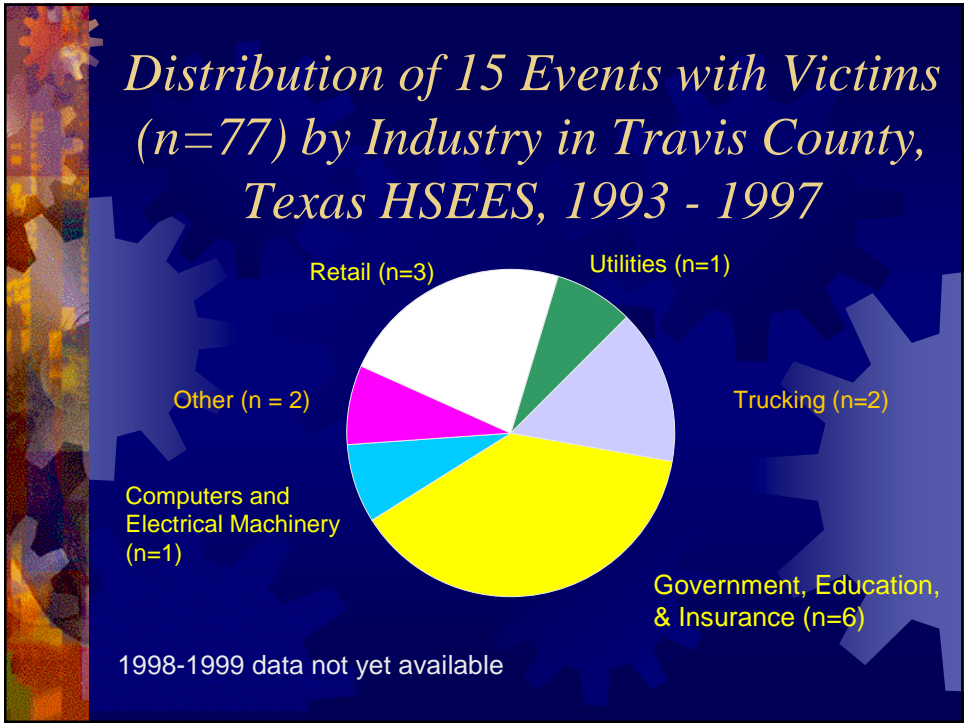
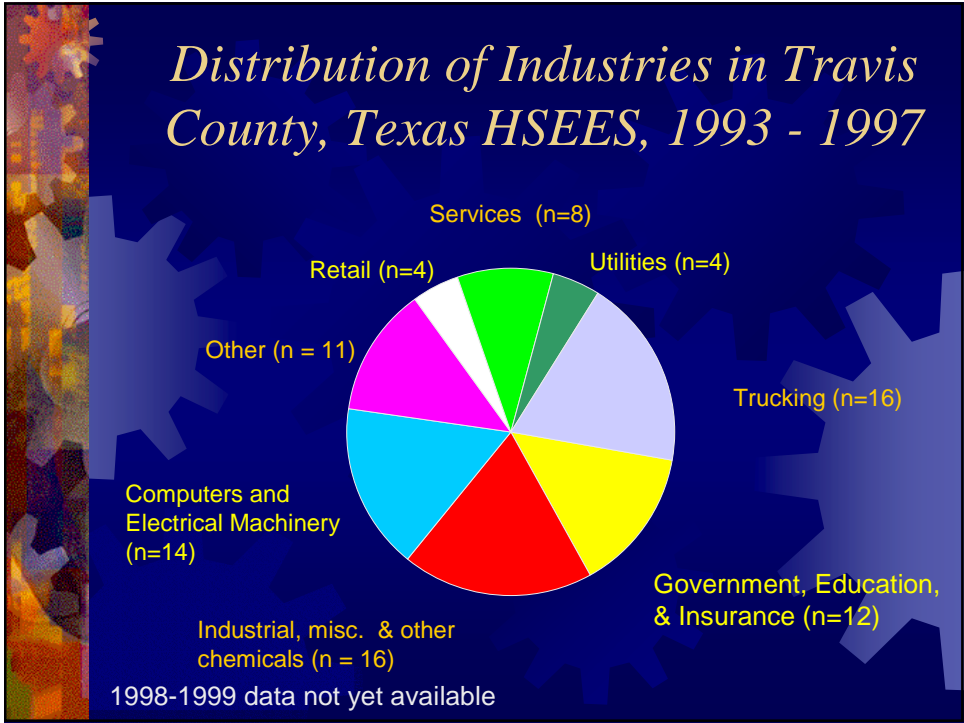
- 78 people injured in fixed-facility events in Travis Co.
- 51 people injured in events involving acids
- 9 people injured in events involving bases
- 3 people injured in events involving chlorine
- 1 person injured in an event involving paint & dye
- 1 person injured in an event involving pesticide

Injuries reported by Victims (n=78) in Fixed-facility Events in Travis County 1993 - 1999

Types of Injuries	Number Reported
Respiratory irritation	41
Trauma	25
Gastrointestinal problems	12
Eye irritation	12
Headache	11
CNS*/dizziness	4
Other	2
Chemical burns	1
Skin Irritation	1
Heart problem	1
Total**	101

*Central Nervous System

**Total number of injuries exceeds number of victims because some people sustained more than one type of injury.





Travis County Case Studies 1993 - 1999

Public Swimming Pool, 1993

A pipe broke and began spilling an unknown quantity of muriatic (hydrochloric) acid into the public swimming pool.

- 24 members of the general public were decontaminated at the scene
- 26 members of the general public were injured, including 22 school children and 4 were admitted to the hospital
- Majority of the reported injuries were respiratory irritation

Underlying causes:

Equipment failure

Public Swimming Pool, 1993

Lessons Learned?

- ☀ Quality assurance inspection of new plumbing or processes when there is a new retrofit
- ☀ Emergency response plan to aid in quickly removing patrons from the pool
- ☀ Decontamination plan and training with lifeguards and pool staff

Grocery Store, 1997

A tornado hit a large grocery store releasing several hundred pounds of acids, bleaches, pesticides, and other chemicals.

- ☀ 14 employees and 9 members of the general public were injured
- ☀ All injuries were trauma, 1 employee admitted to the hospital

Underlying causes:

Weather



Grocery Store, 1997

Lessons Learned?

- Rapid response on the part of the employees (moving people into the walk-in freezer) prevented more serious consequences
- Reduce inventories of acid and bleach-like chemicals. With this many chemicals, do they have absorbent materials and clean-up plan?
- Review emergency response plan



Elementary School, 1993

A pipe in the heating system in an elementary school broke and spilled 1600 gallons of ethylene glycol, sodium hydroxide, and water.

- Injured 9 elementary school children who received first aid or saw their private physician.
- Reported injuries included respiratory irritation, GI difficulties, and headaches.

Underlying causes:

Equipment failure

Elementary School, 1993

Lessons Learned?

- When the spill initially occurred, the children were moved to another part of the school and were not allowed to enter the first floor on the first day.
- Kids were allowed in on the second floor on the second day and that is when the injuries occurred.
- Better ventilation
- Better emergency response plan
- Improve maintenance inspection schedule
- Secondary containment?

Water Treatment Plant, 1994

In January 1994 a chlorine cylinder began releasing chlorine gas.

- 1 employee experienced dizziness and vomiting and was admitted to the hospital
- Closest home was estimated to be 500 to 1000 feet away from the release

Underlying causes:

Equipment failure



Water Treatment Plant, 1994 Lessons Learned?

- Chlorine valve secured.
- Improve work place practices
- Use stepwise standard operating procedures for changing chlorine tanks (include using SCBA or respirators)
- Proper maintenance and replacement of corroded or suspect equipment
- More frequent inspection periods for equipment/gauges at critical points of control



Government Office Building, 1994

Fire sprinkler system began releasing built up Hydrogen Sulfide gas.

- Evacuated 102 employees
- One employee admitted to hospital for respiratory irritation (asthma) and GI difficulties
- Underlying causes:
Equipment failure

Government Office Building, 1994 Lessons Learned?

- Ventilated with exhaust fans
- More frequent inspection of sprinkler system
Check for biological contaminants and periodically back flush the system
- Troubleshooting – Why did the hydrogen sulfide formation occur?
- Have an emergency evacuation plan and frequently drill.
- Develop response plan, include equipment monitoring, training, and provision of PPE

Chemical Tanker Truck, 1995

Chemical tanker truck was involved in an accident on Bastrop Hwy, spilling diesel fuel and a mixture of 30 gallons of methyl alcohol/quaternary ammonium chloride.

- ☀ Road closed at 5th Street, 7th Street, and overpass to 5th Street.
- ☀ One employee (truck driver) admitted to hospital for trauma injuries including broken neck and lacerations
- ☀ Underlying causes:
Operator error?

Chemical Tanker Truck, 1995 *Lessons Learned?*

- Vactruck recovered product. Boomed off outlet into Lower Colorado River
- Better training for truck drivers?
- Good integrated response plan for county highways for hazardous materials containment and cleanup
- Annual drills with responders and communities, including professional and volunteer fire departments, EMS, police, and highway patrol

In Conclusion:

- **Anticipate** – there will be chemical release events in Travis County. Hazardous chemicals are being transported through this area and they are used in local industries.
- **Recognize hazards** - especially situations involving acids, bases, or chlorine. In fixed facilities, be aware of material handling (loading/unloading), storage above ground, and piping.
- **Evaluate** - Operator error and equipment failure are the two most identified causes for releases.
- **Control** - Keep up training and good work and safety practices.
- **Remember** - Explosions and crashes causing trauma injuries often result in fatalities.



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