

# **Chemical Handling : Bulk Liquid Chemical Unloading**

**Northern Michigan  
Wastewater Operators  
Seminar**

**September 23, 2008**



**Different Chemicals =  
Different Hazards**

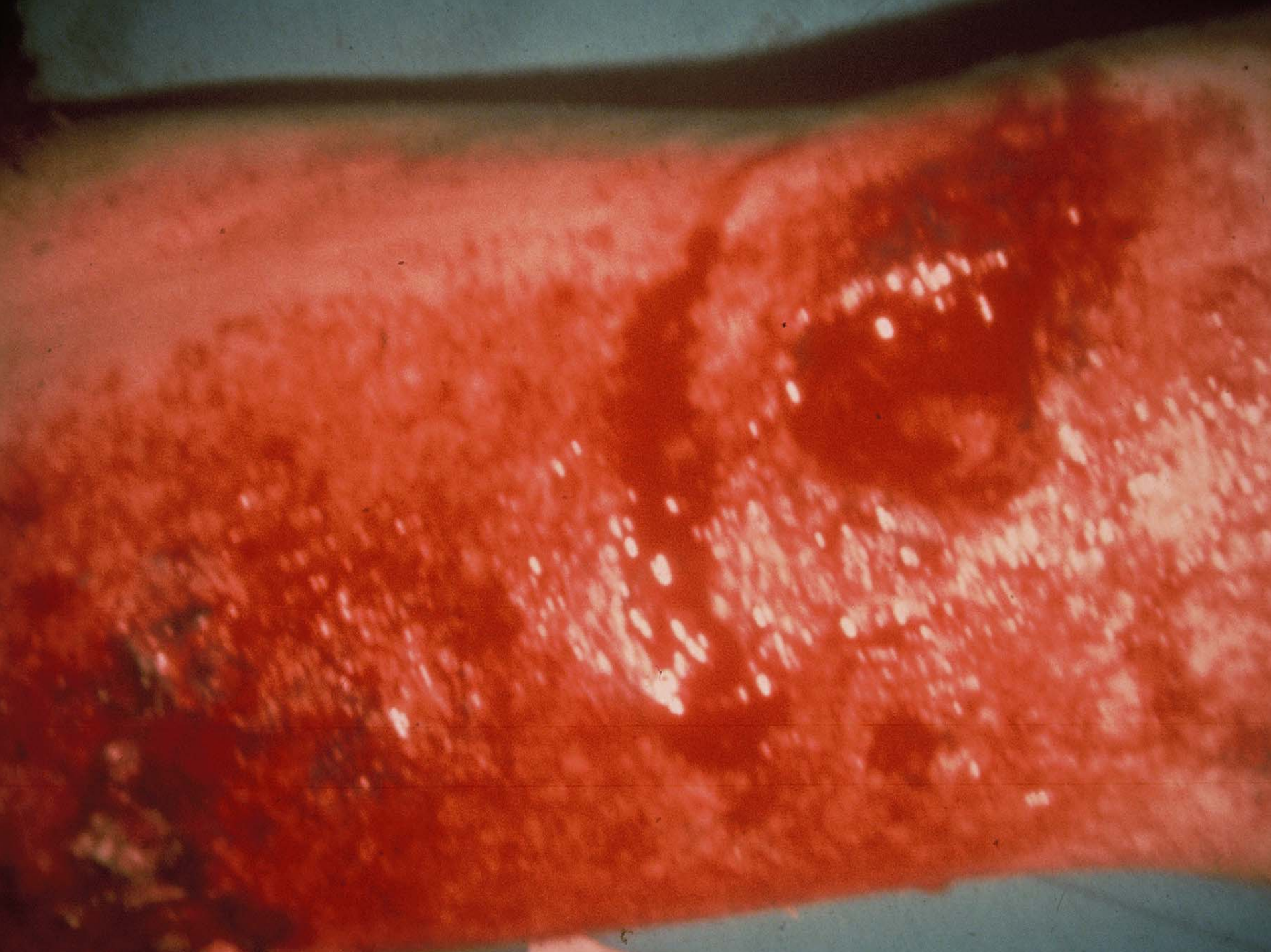
**“Right to Know”**

# Why Care?

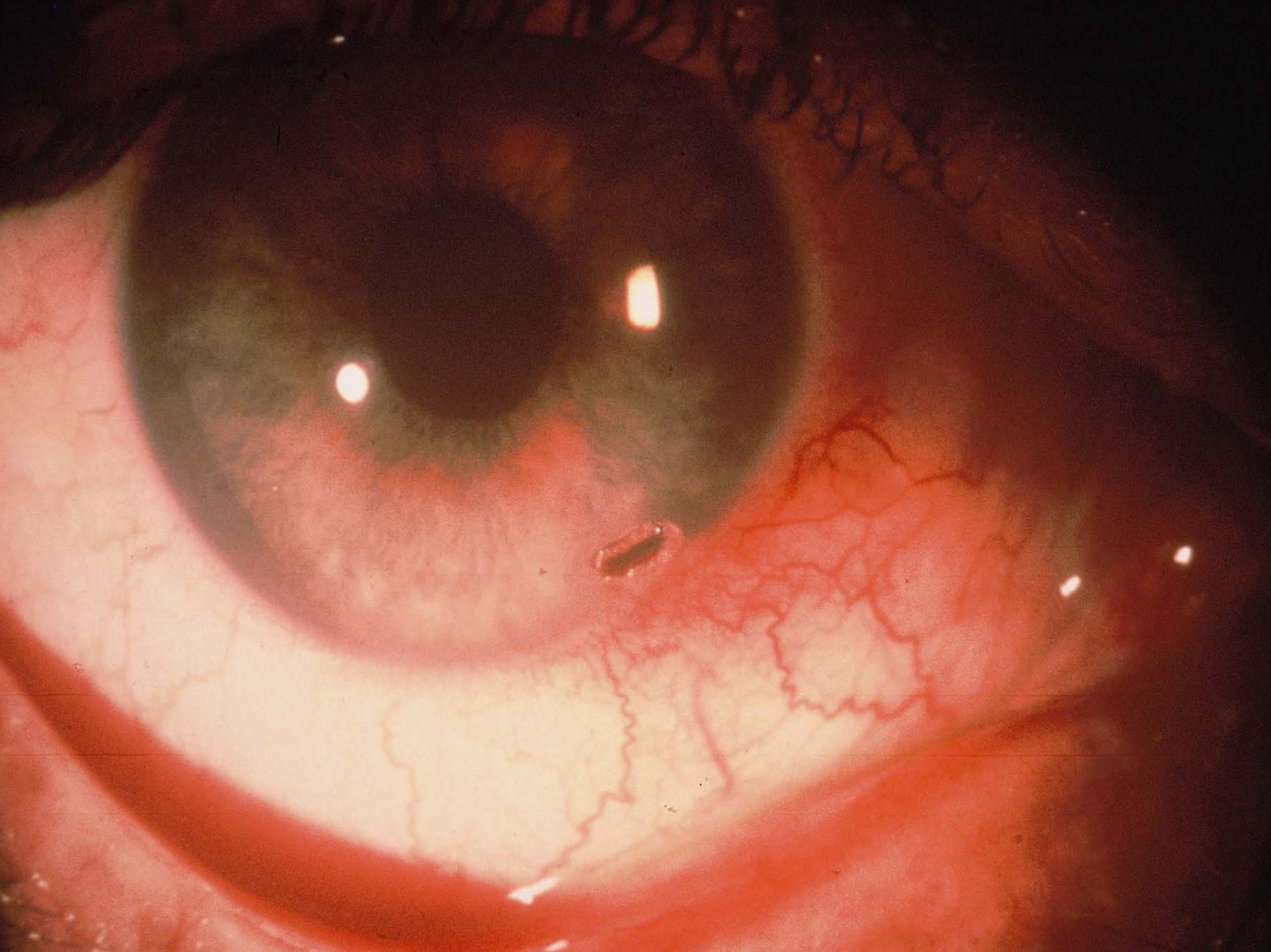
- Chemical Burn (~15,000/yr)
- Secondary Heat burn
- Loss of vision
- Disfigurement
- Death

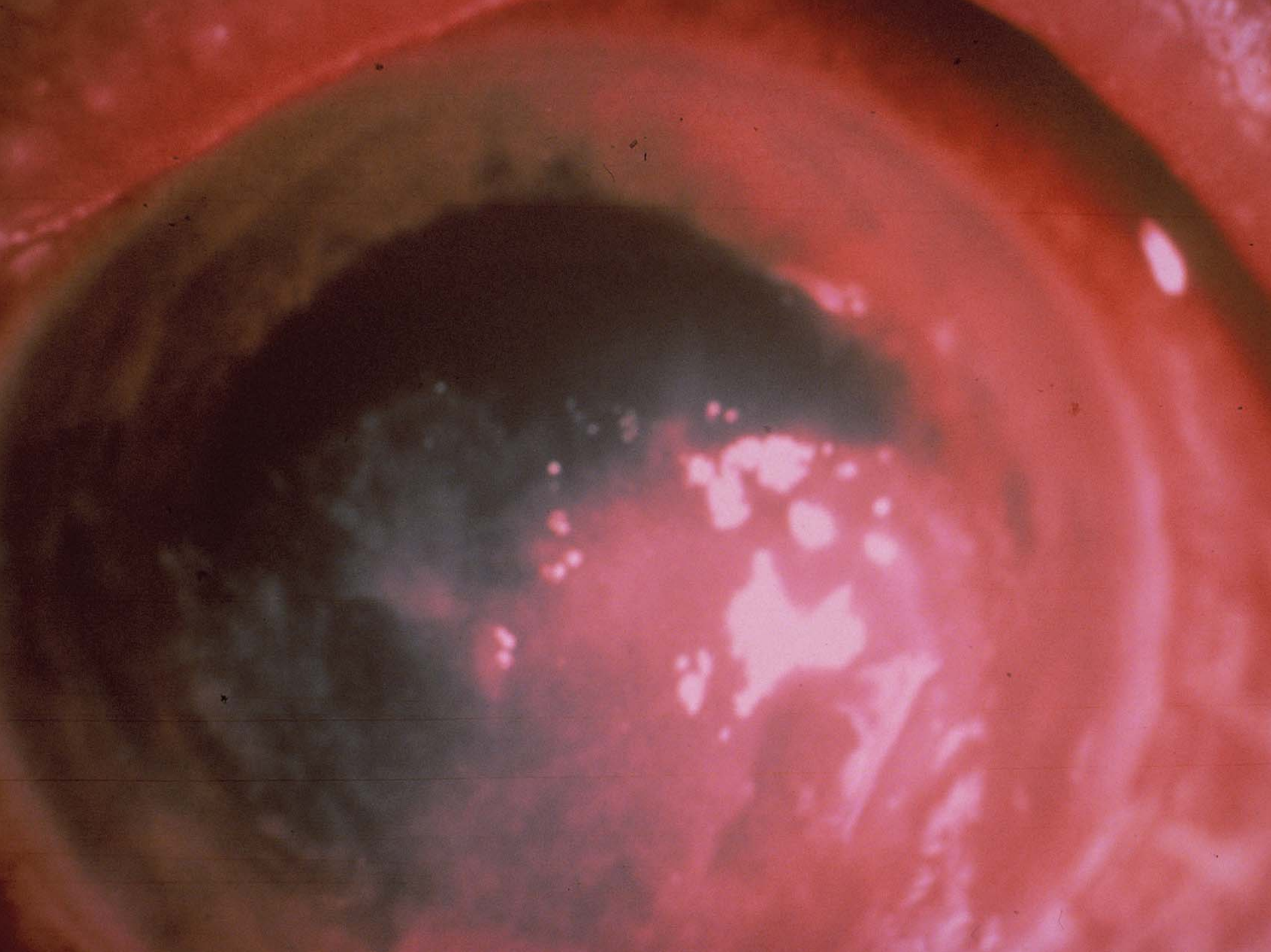
# Acid Burn - Shoes













# Outline of Topics:

- Common bulk chemicals
- Material Safety Data Sheet -MSDS
- Storage / Delivery Vehicle
- Unloading Procedures
- Personal Protective Equipment
- Materials of Compatibility
- Spill Response
- Questions

# Common Bulk Chemicals

- Ferric Chloride –  $\text{FeCl}_3$
- Ferrous Chloride –  $\text{FeCl}_2$
- Aluminum Sulfate –  $\text{Al}_2(\text{SO}_4)_3$
- Sodium Bisulfite –  $\text{NaHSO}_3$
- Sodium Hypochlorite -  $\text{NaOCl}$
- Caustic Soda -  $\text{NaOH}$

<http://webbook.nist.gov/chemistry/cas-ser.html>

# Material Safety Data Sheet - MSDS

- OSHA's Hazard Communication Standard (HCS) specifies certain information that must be included on MSDSs, but does not require that any particular format be followed in presenting this information.
- OSHA recommends that MSDSs follow the 16-section format established by the American National Standards Institute (ANSI) standard for preparation of MSDSs (Z400.1).

# MSDS – 16-section format

1. Identification
2. Hazard(s) identification
3. Composition/information on ingredients
4. First-aid measures
5. Fire-fighting measures
6. Accidental release measures
7. Handling and storage
8. Exposure controls/personal protection
9. Physical and chemical properties
10. Stability and reactivity
11. Toxicological information
12. Ecological information
13. Disposal considerations
14. Transport information
15. Regulatory information
16. Other information

# Common Q's - MSDS

## Information Contained:

- Health Hazards
- Target Organs
- Toxic - cause illness or death
- Corrosive – metal or skin, or both
- Irritant – inflammatory effect on site of contact
- Asphyxiant – Replaces the oxygen in the air
- Acute – has an immediate effect on a person
- Chronic – develops after repeated exposure

# Materials of Compatibility

- **Ask Manufacture or Engineer**
- **Stainless steel is not universal!**
- **Fittings**
- **Distribution system / Pumps**

# Bulk Chemical Storage

- **Dependent on chemical to be stored**
  - Indoor/outdoor
  - 6000 gal recommend capacity
- **Material compatibility**
- **Volume on hand**
  - Ex. WTP 30 day storage
- **Neat solution contact through distribution**
- **Outside – lights**
- **Dyke**
- **Labels**

# Storage Tanks





# Labeling

## NFPA Diamond



- Tank(s)
- Line(s)
- Hookup(s)

# Delivery Vehicle

- RailCars
- Tank Trucks

# Delivery Vehicle – RailCar

17,000 gallon



# Delivery Vehicle – Tank Truck

- MI – 4000, 6000, 8000 gallon
- Material compatibility
- Placard



# DOT Hazmat Placard

Sodium Hydroxide



Ferric Chloride



Sodium hypochlorite



Aluminum sulfate



Sodium Bisulfite



# Bulk Chemical Unloading Procedures

- Have written procedures for personnel
- Bill of Lading – signature required for most
- Lock out – Tag out
- Check Placard

# Personal Protective Equipment -PPE

- **Requires**
  - Rubber gloves
  - Rubber boots
  - Tyvek suit
  - Chemical splash goggles
  - Face shield
  - Hard Hat
- **Route of Entry**
  - Eyes, Mouth, Nose, Open Skin, Skin Contact

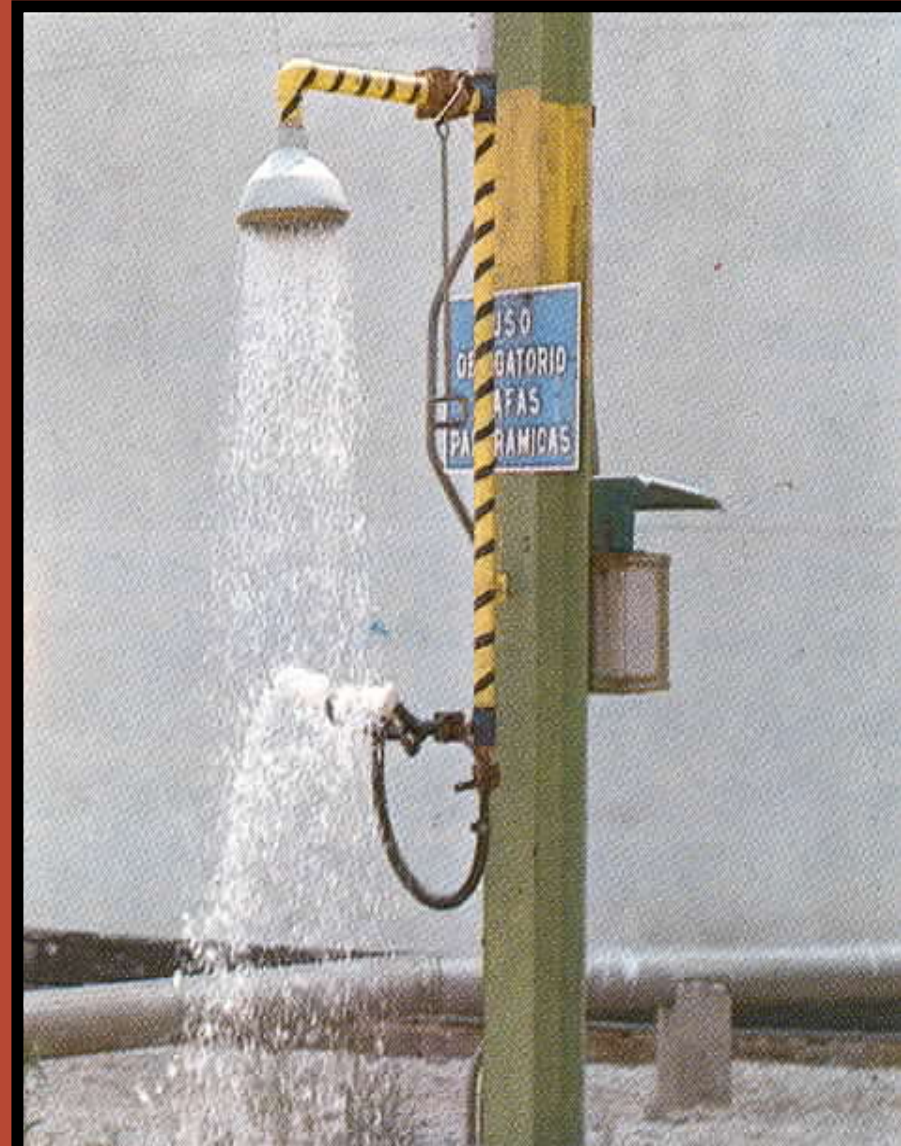


# Unloading – Safety

## Showers

ANSI Z358.1-2004 Revision of ANSI Z358.1-1998 **American National Standard for Emergency Eyewash and Shower Equipment**

6.4.2 States “Be in accessible locations that require no more than 10 seconds to reach. The eye/face wash shall be located on the same level as the hazard and the path of travel shall be free of obstructions that may inhibit the immediate use of the equipment. For a strong acid or strong caustic, the eye/face wash should be immediately adjacent to the hazard” (page 13).





# Materials of Compatibility – In Brief

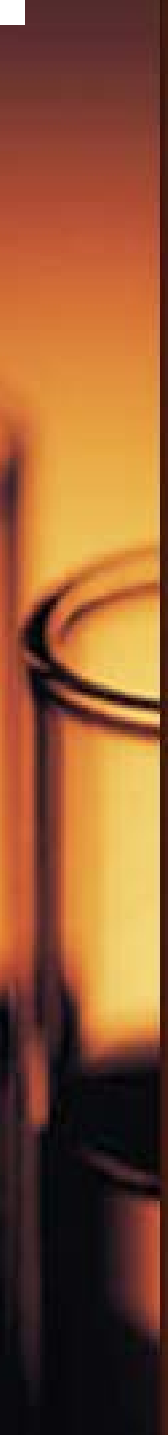
- Sodium Bisulfite - Stainless Steel, Fiberglass Reinforced Polyester (FRP) with extra interior corrosion protection layer
- Ferric Chloride – No Stainless! PVC Schedule 80
- Ferrous Chloride – No Stainless! PVC Schedule 80
- Sodium Hypochlorite – PVC Schedule 80
- Aluminum Sulfate – Can use stainless
- Caustic Soda - Ref to Chlorine Institute Pamphlet 94 – Sodium Hydroxide & Potassium Hydroxide Solution: Storage Equipment & Piping Systems, Can use Stainless
- **CONTACT THE MANUFACTURER**

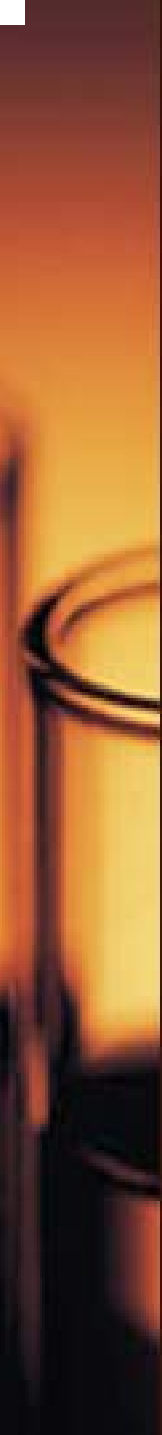
# Spill Response

- Different regulations for reporting spills
  - Osha Reportable
  - Osha Recordable
- Contain spill to prevent waterway contamination
- Have plan in place – local authorities
- Call local emergency agencies
  - Hazardous Communication (HAZ COM)
- National Response Center (800) 424-8802
- Delivery – Chemtrec (800) 424-9300

# Material of Compatibility

## Video by CSB





PVS Chemicals provides the information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy. This presentation is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person using this product. Individuals receiving the information must exercise their independent judgment in determining its appropriateness for a particular purpose.



Questions?