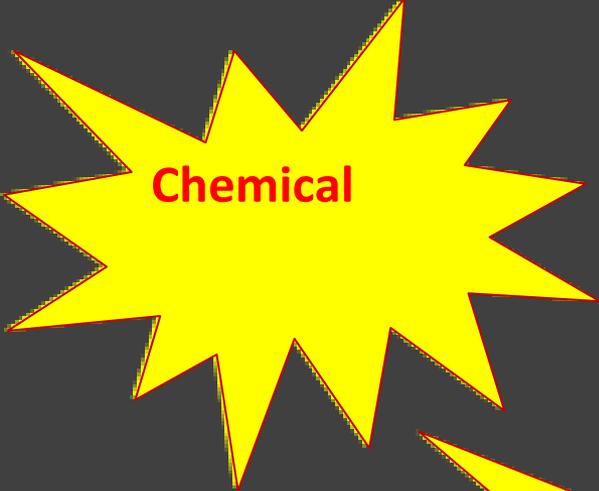
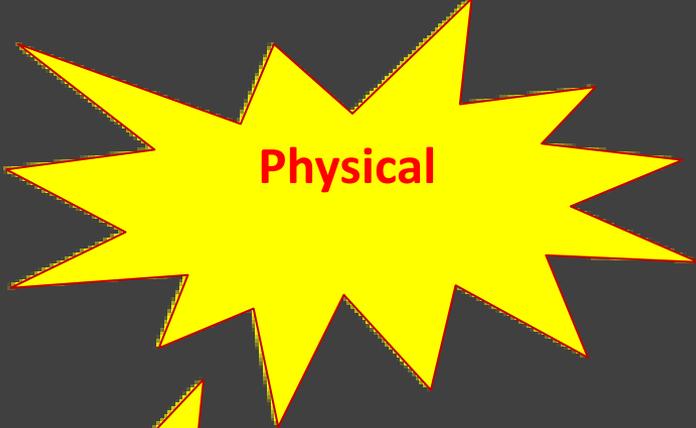


The Hazards



Chemical



Physical



Environmental

Hazardous Material

- A hazardous material is a substance that “jumps out at you when something goes wrong, and hurts or harms the things it touches” (Ludwig Benner, EMA).



Trooper & Ammonia
Video

Effects of Chemicals

- **Characteristics of the chemical Itself**
- **Type of contact**
- **Dose of chemical**
- **Individual sensitivity**
- **Interaction with other chemicals**
- **Duration of exposure**

Routes of Exposure

- **Inhalation**
- **Ingestion**
- **Contact with skin or eyes**
- **Absorption**

Types of Exposure

- **Chronic Exposure-** exposure to a substance over a relatively prolonged period of time.
- **Acute Exposure-** single significant exposure

Permissible Exposure Limit

- The concentration of a certain chemical that a persons can be exposed to without protection.
- Given as an 8 hour (40 hour work week) Time Weighted Average (TWA)
- Also seen as a Ceiling limit (C)

Exposure Limits

Chemicals	PEL
Acetone	1000 ppm TWA
Chlorine	1 ppm C
Methyl alcohol	200 ppm TWA
Phosphine	.3 ppm TWA
Toluene	200 ppm TWA
Iodine	.1 ppm C

IDLH
2500 ppm
10 ppm
6000 ppm
50 ppm
500 ppm
2 ppm

MSDS

The OSHA developed MSDS contains eight sections (OSHA Form 174):

- The identity of the chemical and name and address, and telephone number of the manufacturer
- Hazardous Ingredients/Identity Information
- Physical/Chemical Characteristics
- Fire and Explosion Hazard Data
- Reactivity Data
- Health Hazard Data
- Precautions for sale Handling and Use
- Control Measures

The New MSDS

There are 16 sections vs. 8 in the OSHA's MSDS version:

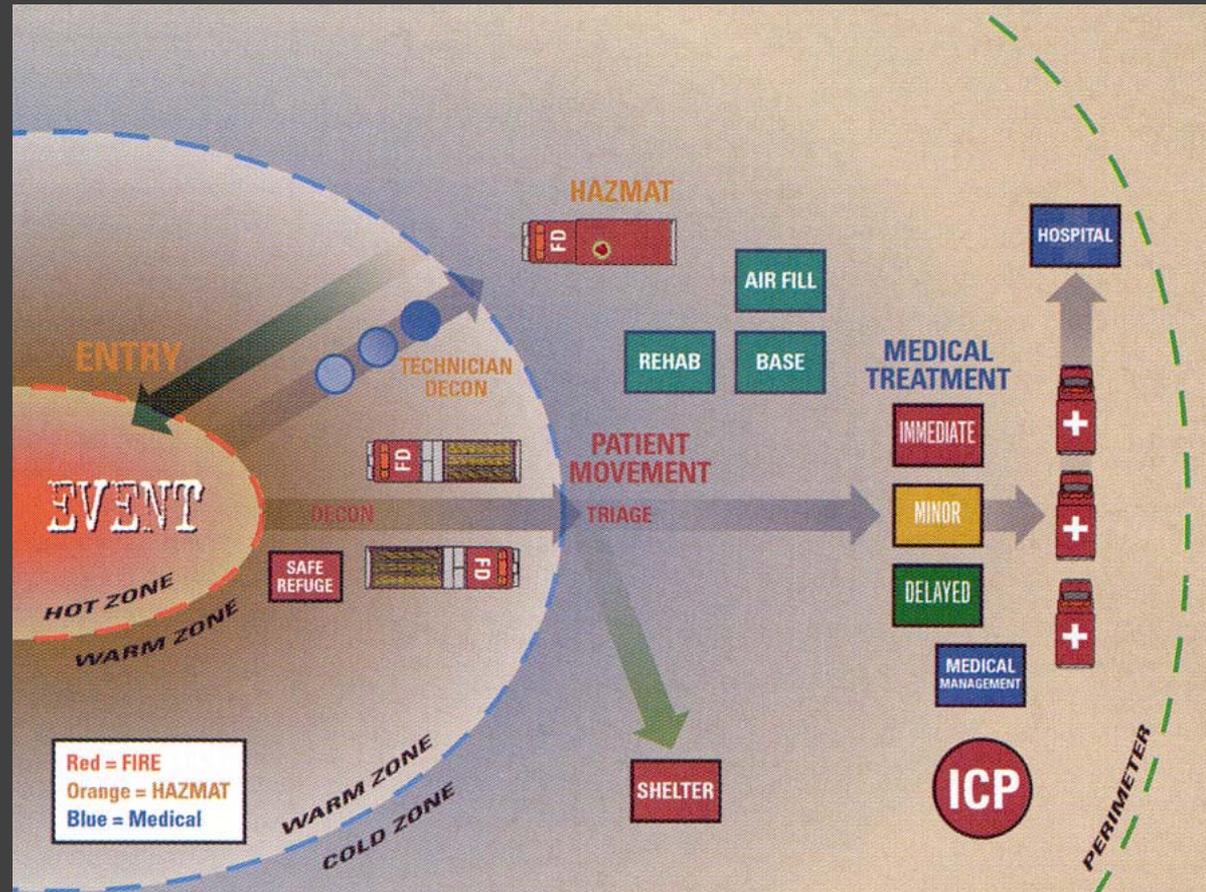
- Section 1. Chemical product and Company Identification
- Section 2. Composition, Information and Ingredients.
- Section 3. Hazards Identification.
- Section 4. First Aid Measures.
- Section 5. Fire Fighting Measures.
- Section 6. Accidental Release.
- Section 7. Handling and Storage.
- Section 8. Exposure controls, Personal Protection.
- Section 9. Physical and Chemical Properties.
- Section 10. Stability and Reactivity.
- Section 11. Toxicological Information.
- Section 12. Ecological Information.
- Section 13. Disposal Information.
- Section 14. Transport Information.
- Section 15. Regulatory Information.
- Section 16. Other information.

Meth Labs

- Are Hazardous Material Scenes
- Source of material must be separated from unprotected people
- People inside scene must use PPE
- Everyone in the scene must be decontaminated

Scene Control

- Hot Zone
- Warm Zone
- Cold Zone



Always Monitor The Air

- Oxygen deficient <19.5%
- Oxygen enriched >23.5%
- Flammable atmosphere
- Toxic
 - Phosphine
 - Ammonia
 - Etc.

Oxygen Deficient Atmosphere

- Visual Distortion
- Loss of Color Perception
- Lack of Coordination
- Inability to Concentrate
- Can't make rational decisions
- Death

Exposure

- If you are exposed to a hazardous substance...
 - Document the exposure
 - Medical examination
 - Historical tracking

HazMat “Watch Outs”

Will it vaporize???

- Low Boiling Points
- High Vapor Pressure

Where will it go if it does???

- Vapor Density
- R gas D

Will it burn???

- Low Flash Point
- Low Lower Explosive Limit
- High Upper Explosive Limit

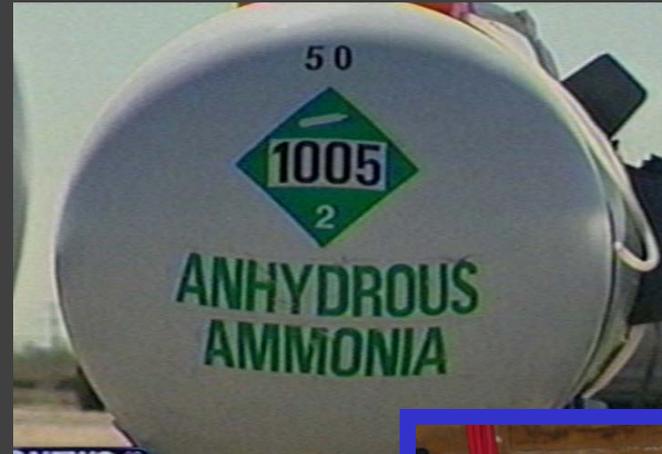
What could adjust these values???

- Increased Oxygen content
- Chemical oxidizers
- Increased ambient temp?

Specific Chemicals

Anhydrous Ammonia

- Stored in large pressurized steel tanks
- Chemical burns. Severe frostbite with contact from gas as it is released from tanks



Courtesy of IAFF, *Illicit Drug Labs* course

Anhydrous Ammonia

- Eye irritation, burns, cataracts
- Inhalation causes bronchospasm, chest pain, burns, chronic cough, fibrosis, death



Lithium

- Usually extracted from lithium batteries
- Water reactive



Ingestion causes abdominal pain, vomiting, diarrhea, tremors, confusion, seizures, coma, kidney failure

Ingestion of a small battery usually goes unnoticed until severe symptoms – severe gastric ulcers and GI bleeds

When reacts with water produces heat & corrosive LiOH

Solvents

- Highly flammable, large quantities
- Many solvents used: camp fuel, toluene



- Inhalation/aspiration cause pneumonitis, pulmonary edema, death
- Ingestion may cause liver or bone marrow failure
- Chronic inhalation causes brain damage

Ether



- **Primary Hazard:**
 - Flammability
- **Health Effects:**
 - Irritation of the eyes, skin, upper respiratory system; dizziness, drowsiness, headache, excited, narcosis; nausea, vomiting
 - Target organs include eyes, skin, respiratory system, and CNS



Alcohol



- **Primary Hazard:**
 - Highly flammable
- **Health Effects:**
 - Irritation of eyes, nose, throat; drowsiness, dizziness, headache; dry cracking skin.
 - Target organs include the eyes, skin, and respiratory system.

Sodium Hydroxide (Lye)

- **Primary Hazard:**

- Caustic

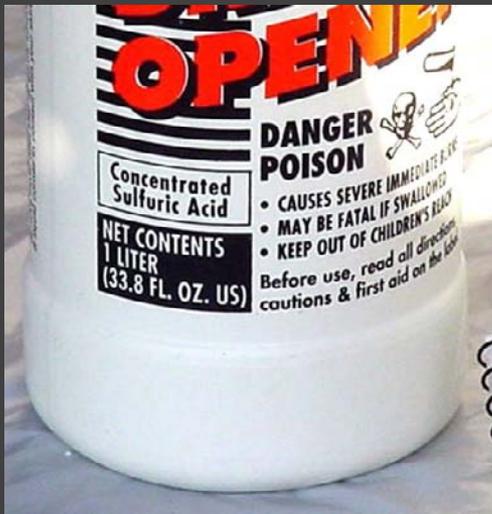
- **Effects:**

- Irritation of the eyes, skin, mucous membrane; pneumonitis; eye, skin burns; temporary loss of hair
- Target organs include the eyes, skin, and respiratory system



Acids

- Stored in large quantities in unmarked containers, frequent spills



Acid inhalation causes respiratory irritation, skin and mucosal erosion, pulmonary edema, death



Sulfuric Acid

- **Primary Hazard:**

- Corrosive and irritant

- **Health Effects:**

- Irritation of the eyes, skin, nose, throat; pulmonary edema, bronchitis; emphysema; conjunctivitis; stomatis; dental erosion; eye, skin burns; dermatitis
 - Target organs include eyes, skin, respiratory system, and teeth



HCl

- **Synonyms**

- Hydrochloric acid (liquid)
- Hydrogen chloride (gas)
- Muriatic acid (Common name)

- **Primary Hazard:**

- Corrosive

- **Health Effects:**

- Irritation of the nose, throat, larynx; cough, choking; dermatitis; solution: eye, skin burns; liquid: frostbite; in animals: laryngeal spasm; pulmonary edema
- Target organs include the eyes, skin, and respiratory system



Hydriodic Acid

- **Primary Hazard:**

- Corrosive and irritant

- **Health Effects:**

- Burning sensation, cough, labored breathing, shortness of breath, sore throat, red skin, blisters, severe deep burns of the eyes.
- Target organs include the eyes, skin, and respiratory system



Red Phosphorus

- Inhalation of powder causes respiratory and eye irritation: cough, bronchitis, burning eyes



When heated with acid, produces LETHAL phosphine gas.

Causes pulmonary edema, liver and kidney failure, psychosis



Phosphine Gas



- **Primary Hazard:**

- Toxic, may ignite spontaneously on contact with air

- **Health Effects:**

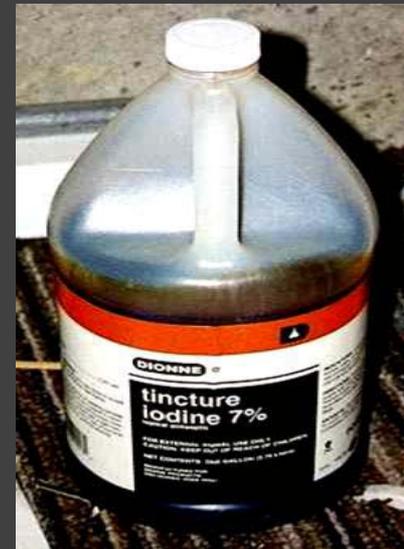
- Nausea, vomiting, abdominal pain, diarrhea; thirst; chest tightness, breathing difficulty; muscle pain, chills; stupor or syncope; pulmonary edema; liquid: frostbite
- Target organs include the respiratory system



Iodine



- Concentrated iodine causes irritation and burns to skin, eyes, respiratory tract, mouth, esophagus.



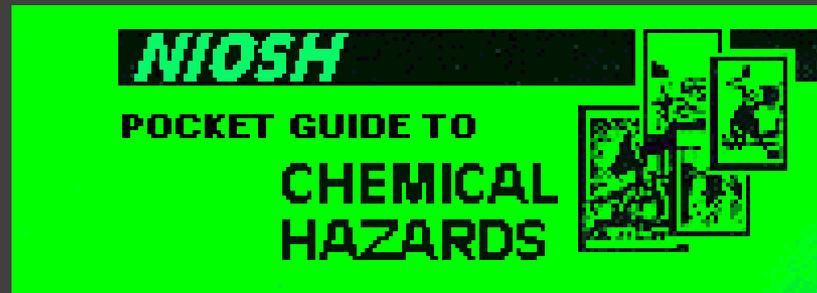
- Chronic ingestion can cause diarrhea, vomiting, pain, thyroid disease. Large ingestion can be fatal.

Chemical References

- www.state.nj.us/health/eoh/rtkweb/rtkhsfs.htm



- <http://www.cdc.gov/niosh/npg/npg.html>
 - 1800-35-NIOSH



Chemical References

- ATSDR's Tox Fact Sheets

<http://www.atsdr.cdc.gov/hazdat.html>

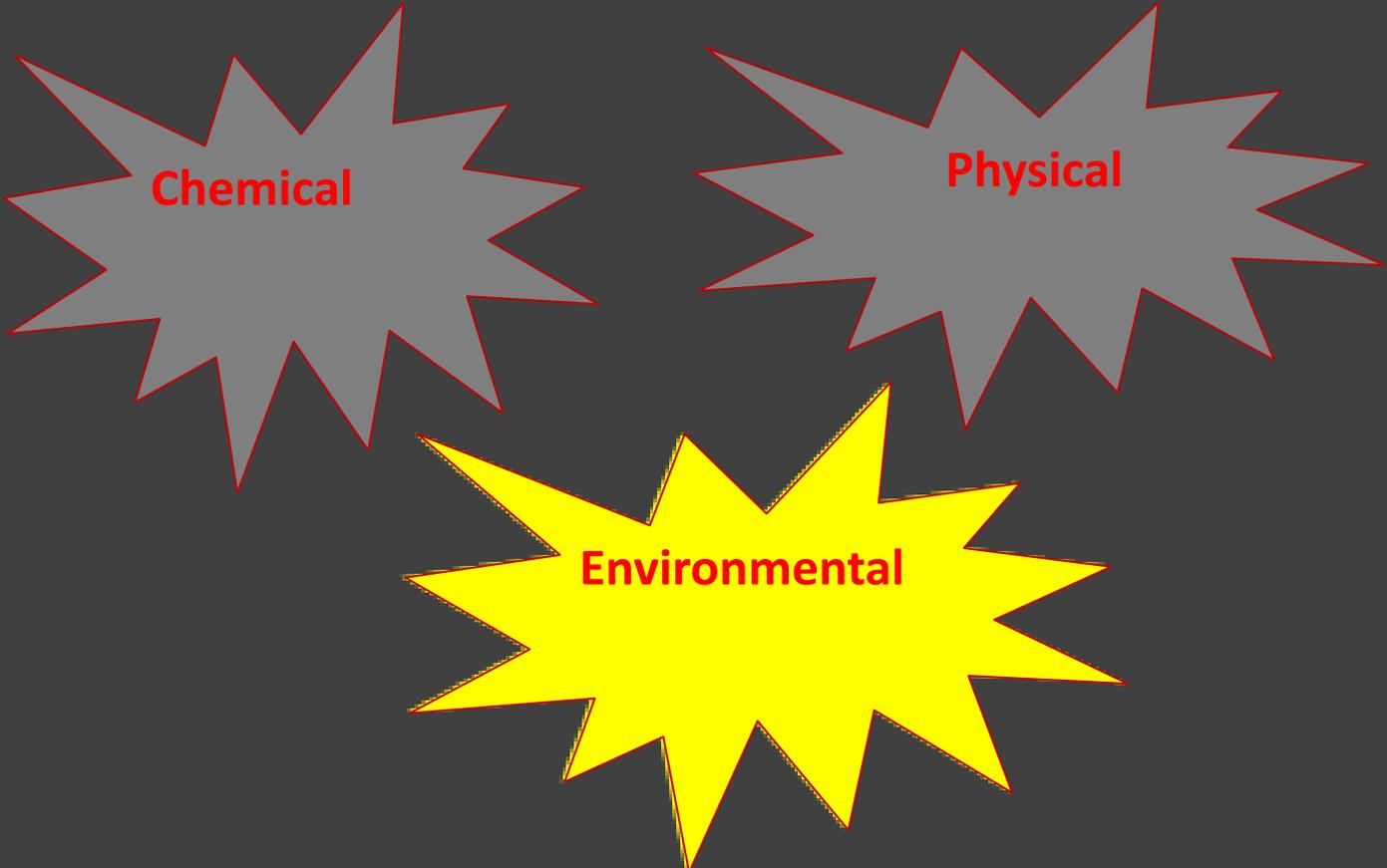


- California EPA,
 - Office of Environmental Health Hazard Assessment (OEHHA)
 - Technical Support Documents and Facts Sheets
 - www.oehha.ca.gov/public_info/clanlabs.html

Chemical References

- **MSDS (Material Safety Data Sheets)**
 - Can be found by using various internet search engines
- **WISER National Library of Medicine**
 - **On Resource Disk 2**

The Hazards



Chemical

Physical

Environmental

Hazardous Wastes

- Regulated by EPA under the Resource Conservation and Recovery Act of 1976.
- Have no commercial value.
- Must be managed from “cradle to grave”

Do you want this responsibility?



1 oz of meth

=

5-6 lbs
of

hazardous waste



Buildings and Soil Contaminated

- Long term contamination—residue may last decades.
- Buildings—usually destroyed
- Soil-removed



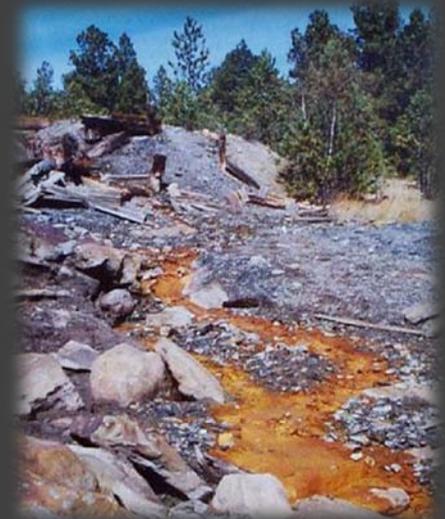
Meth wastes are often disposed of by simply flushing the toilet...or pouring the waste down the drain.



Possibly contaminating water supply systems.



Cookers often
dump hazardous
wastes along and
in waterways...



... and along roads
and highways

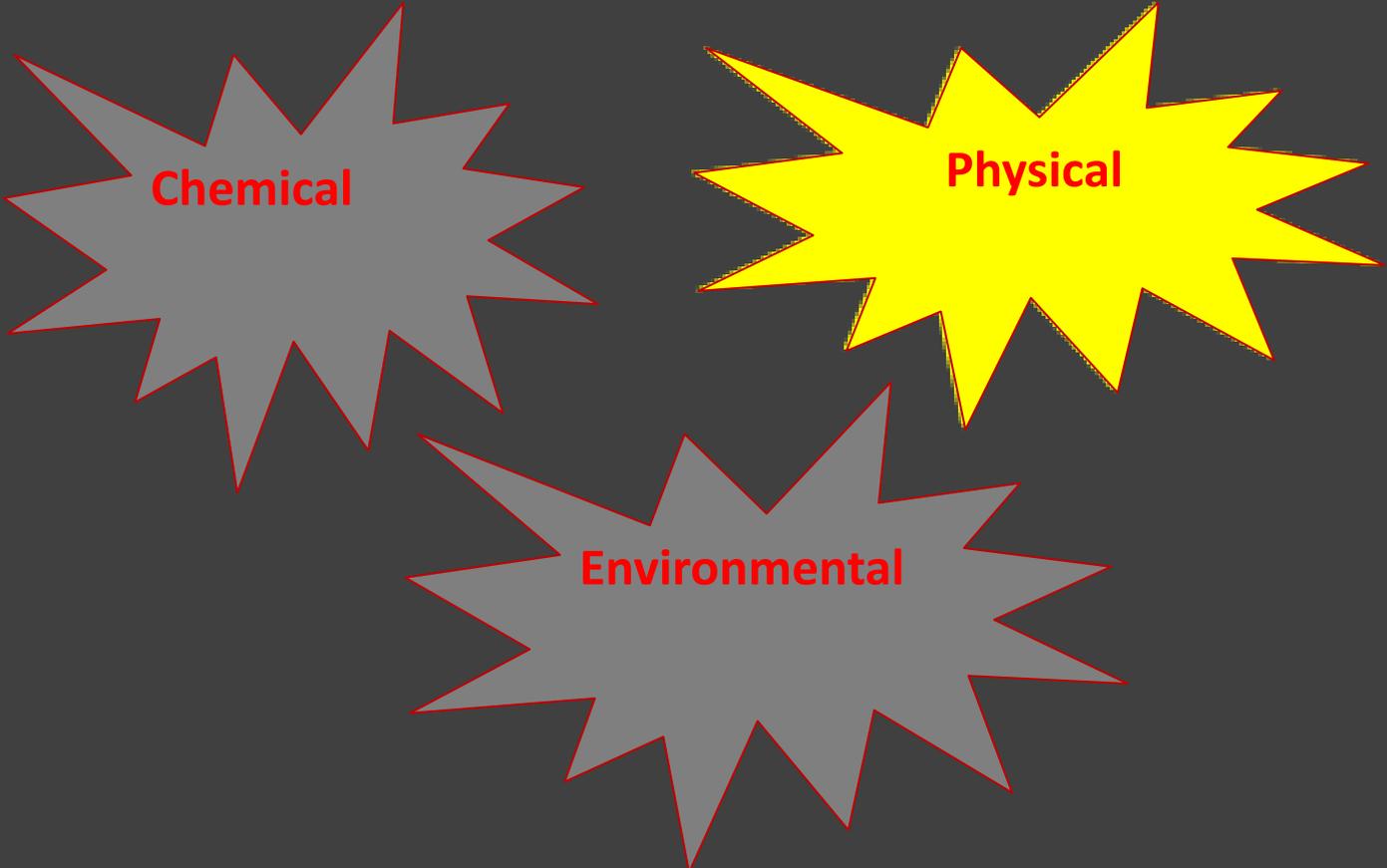
Wastes are Often Disposed of By Burning...



- ...Producing toxic fumes and residues.



The Hazards



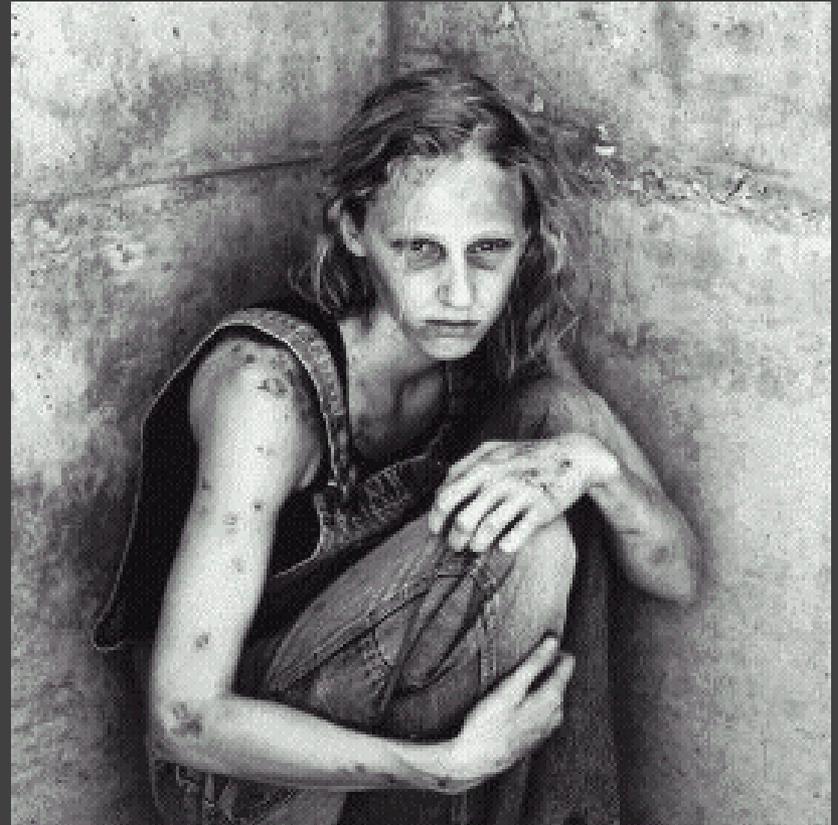
Chemical

Physical

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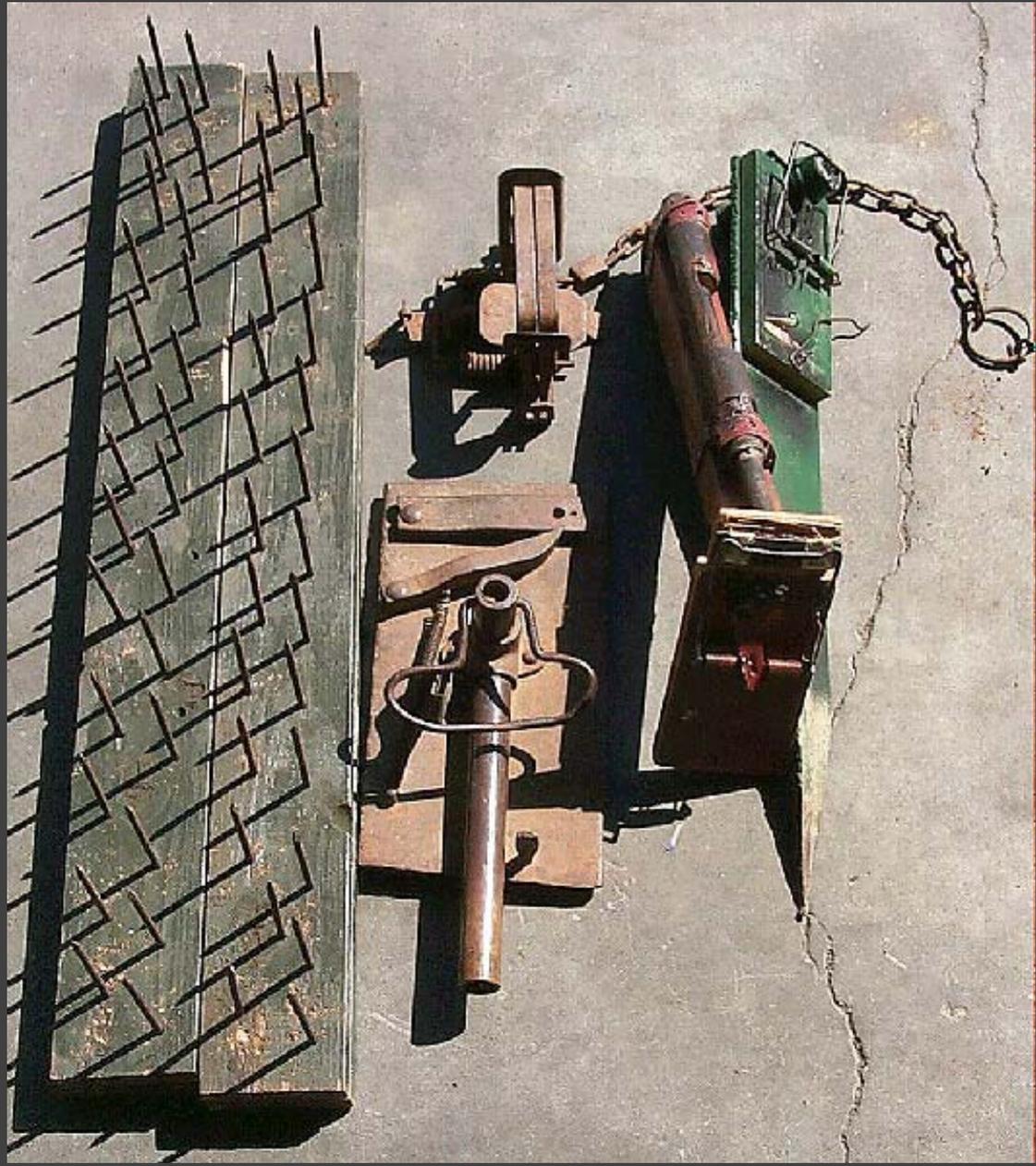
Suspects

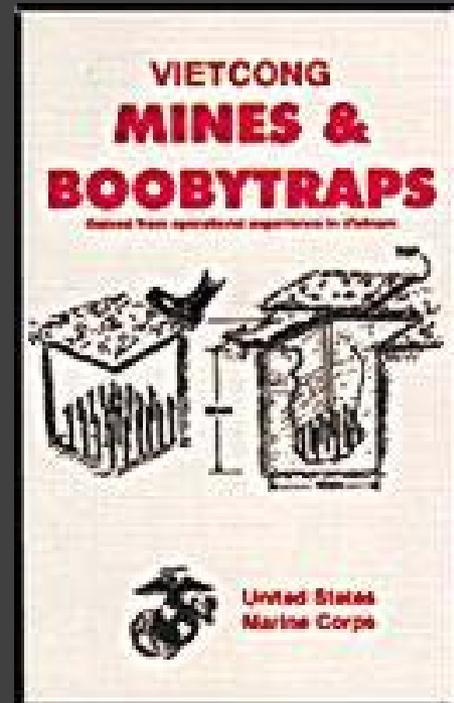
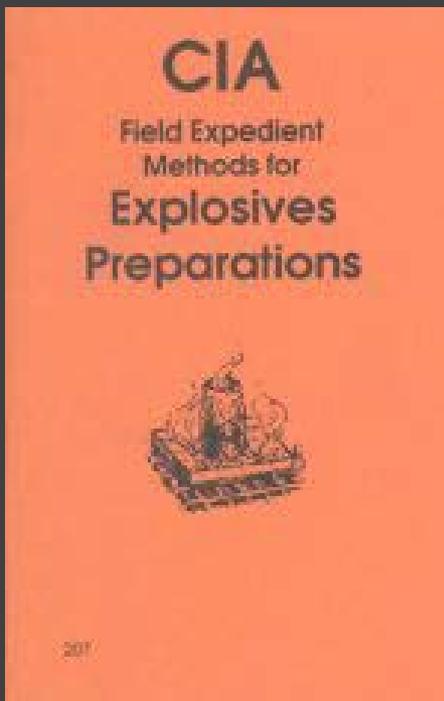
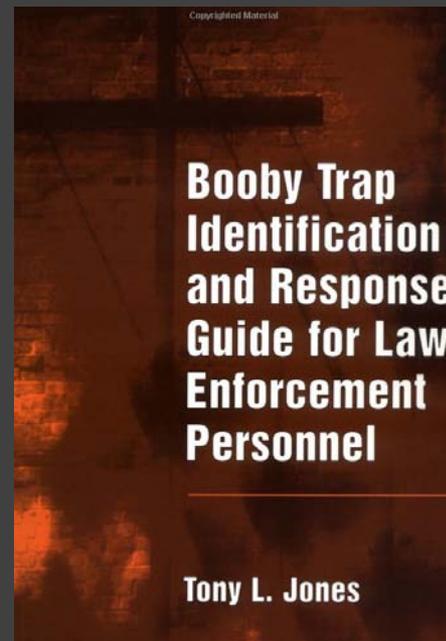
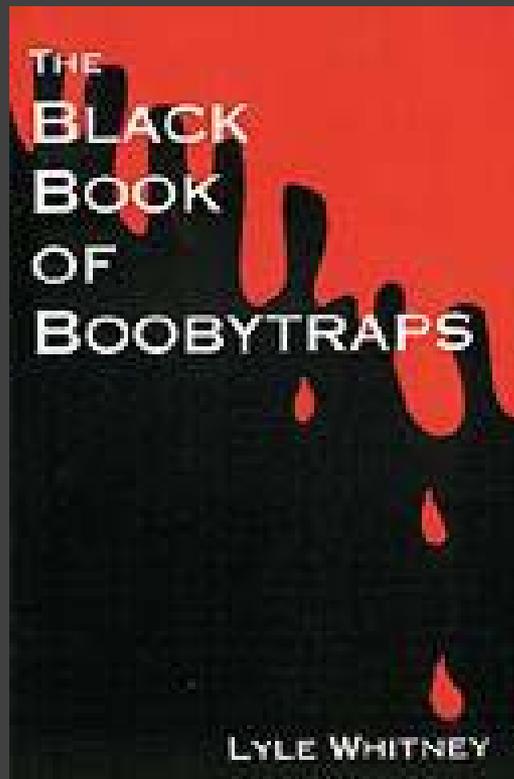
- Generally users are extremely paranoid and violent



Tweaker's Paranoia







Other

