

THE HAZARDOUS MATERIALS INCIDENT

1. WHAT ARE HAZARDOUS MATERIALS?

Hazardous materials can be defined in a number of ways; here are three common definitions:

a. Any substance or material in a quantity or form that poses an unreasonable risk to safety or health and property when transported in commerce.

b. Any element compound, or combination thereof, which is flammable, corrosive, etc., and which, because of handling, storage, processing or packaging may have detrimental effects on operating and emergency personnel, the public, equipment, and/or the environment.

c. Any substance that must be placarded when moving in interstate commerce.

2. TRANSPORTATION PROBLEMS.

During the period 1971 through 1975 there were approximately 32,000 hazardous materials incidents reported to the U.S. Department of Transportation. (See Chart)

3. CHEMICALS

The top 25 chemicals manufactured in 1973 are as follows:
(See Chart)

Discuss some of these chemicals found on Camp Lejeune.

4. REGULATION OF HAZARDOUS MATERIALS TRANSPORTATION

There are five major methods for moving hazardous materials from one point to another:

- a. train
- b. barge
- c. truck
- d. airplane
- e. pipeline

(See Table 1-3)

Within each of the methods are various elements that make up the transportation system:

- a. the BASE on which the system moves
- b. the vehicle that does the transport
- c. the container for the material
- d. the cargo that goes into the container

5. THE DEPARTMENT OF TRANSPORTATION

This Department has the overall responsibility for regulating the various modes of transportation of hazardous material shipments. Within the Federal Department of Transportation a different agency has a regulatory responsibility for each method of transportation:

<u>MODE</u>	<u>AGENCY</u>
train	Federal Railroad Administration
truck	Federal Highway Administration
vessels	U.S. Coast Guard
airplane	Federal Aviation Administration
pipeline	Office of Pipeline Safety

6. OTHER STATISTICS CONCERNING ACCIDENTS

Between 1963 and 1968, train accidents increased by 66%.

Highway freight is increasing at four times the population growth.

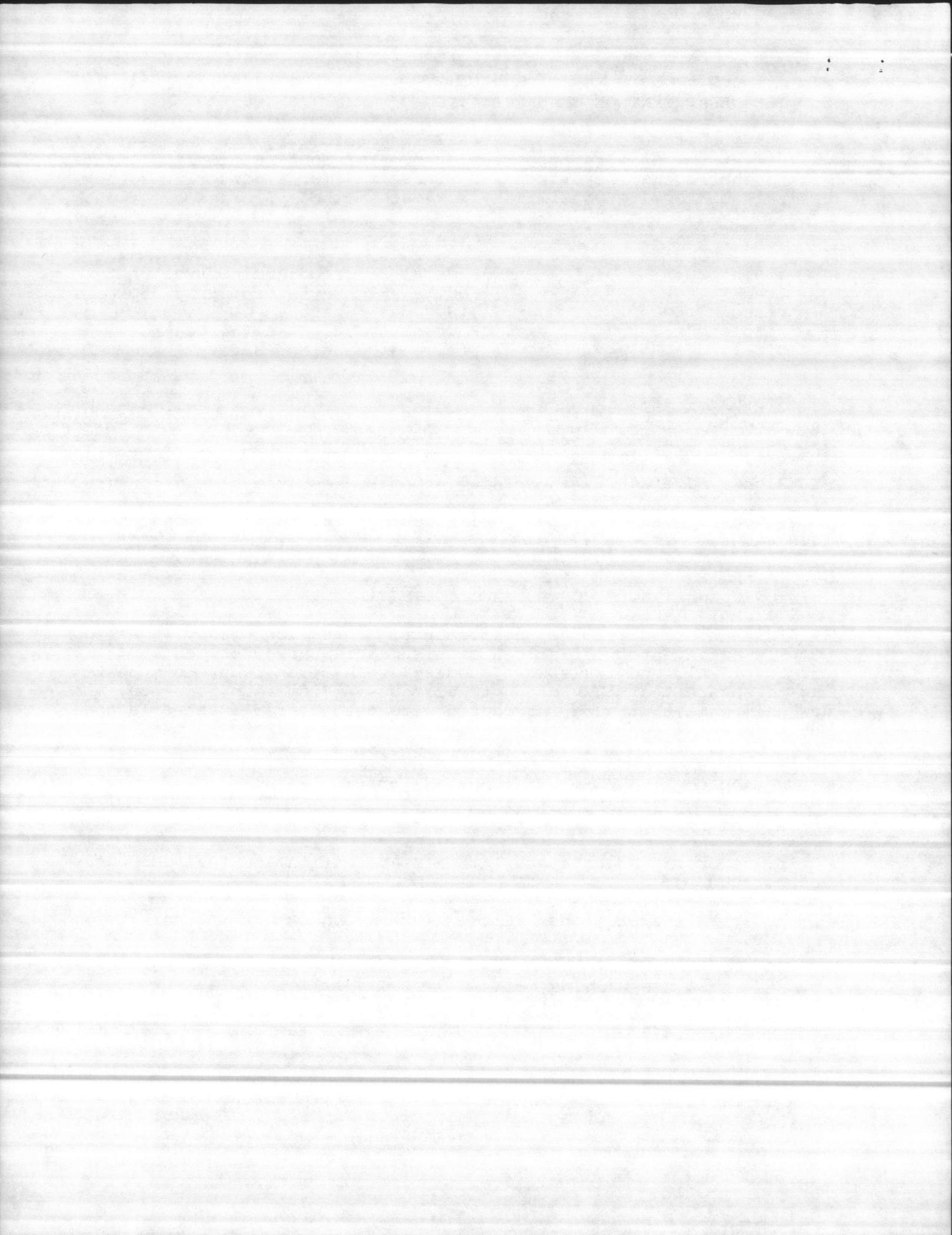
Waterway transportation is increasing at three times the population growth.

7. TOXIC SUBSTANCES CONTROL ACT OF 1977

This Act required the Environmental Protection Agency (EPA) to compile an inventory of all chemicals manufactured between 1974 and 1976. All chemicals were studied; some given laboratory testing to assure that they are not hazardous. From this point on, all new chemicals that were introduced were tested from a safety standpoint.

8. COMMON LOCATIONS OF HAZARDOUS MATERIALS

- a. high schools with its chemistry labs
- b. sporting goods store with its ammunition and fuel for outdoor stoves
- c. gasoline stations
- d. propane distributors
- e. bulk storage plants
- f. hospitals



9. WHY ARE THERE SO MANY FATALITIES WITH HAZARDOUS MATERIAL EMERGENCIES?

- a. inadequate knowledge
- b. delay in contacting assistance
- c. lack of effective communications
- d. lack of a plan

10. CONSIDER EVERY HAZARDOUS MATERIAL INCIDENT A HAZARD TO PERSONNEL UNTIL THE PROPERTIES OF THE MATERIAL ARE DETERMINED

11. CATEGORIES OF HAZARDOUS MATERIALS

EXPLOSIVES

CLASS A: present a maximum hazard through ^{detonation} deterioration.

EXAMPLE: dynamite, TNT, black powder

CLASS B: present a flammable hazard and function by deflagration (to burn suddenly and violently)

EXAMPLE: display fire works, rocket motors

CLASS C: are those materials or devices that contain restricted quantities of either Class A or Class B explosives or both, but present a minimum hazard

EXAMPLE: detonating fuses, common fireworks, small arms ammunition

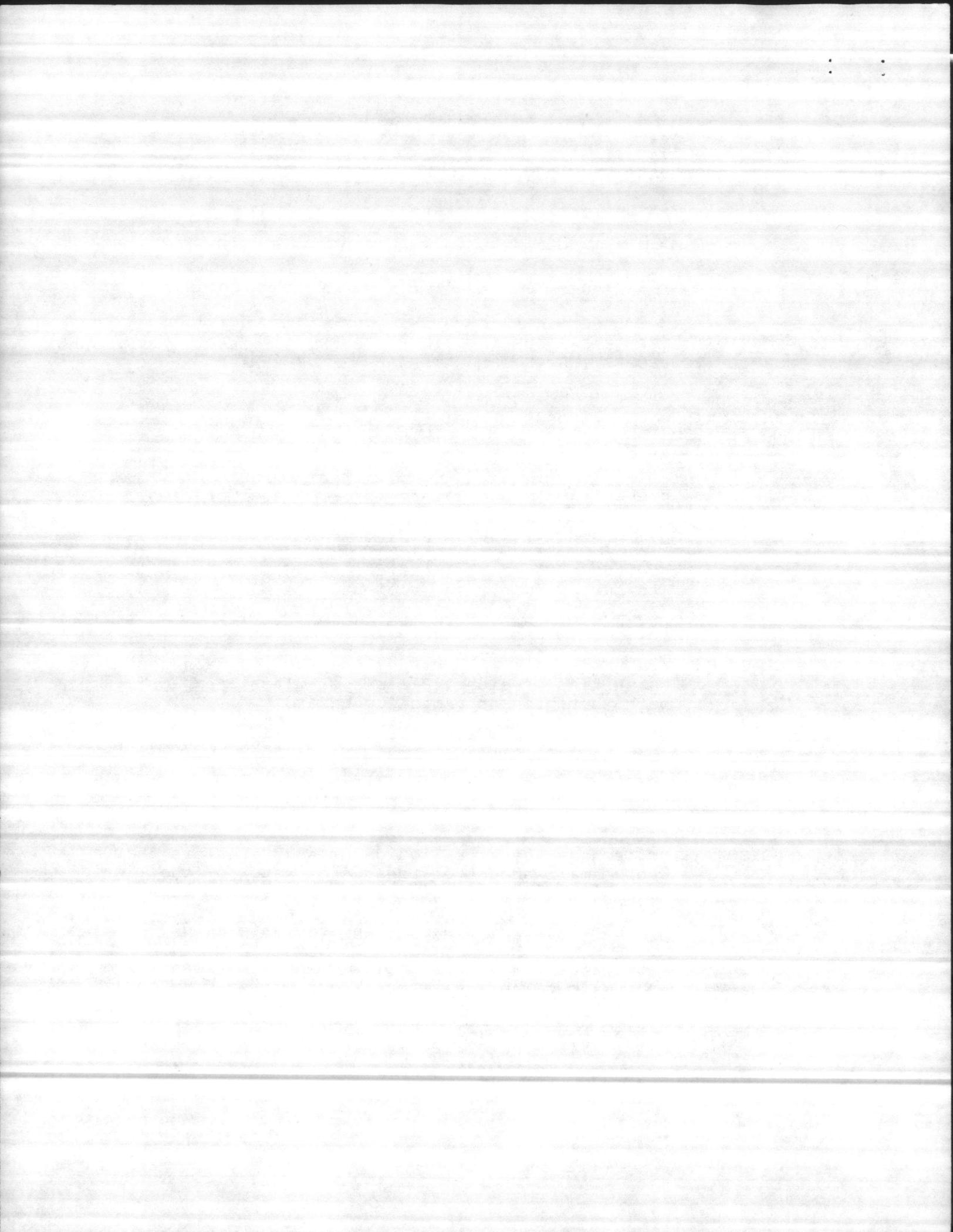
POISONS

POISON A: poisonous gases or liquids of such a nature that a very small amount of the gas or vapor of the liquid mixed with air is extremely dangerous to life

EXAMPLE: bromacetone, cyanogen, hydrocyanic acid

POISON B: poisonous liquids or solids which are known to be so toxic to humans as to afford a hazard to health during transportation

EXAMPLE: silver cyanide, parathion (liquid)



RADIOACTIVE MATERIALS

Radioactive material is any material that spontaneously emits ionizing radiation.

EXAMPLE: iodine (radioactive), cobalt, enriched uranium, plutonium

COMPRESSED GASES

Compressed gas is any material or mixture having in the container absolute pressure exceeding 40 pounds per square inch at 70°F. It is any flammable gas that will burn.

EXAMPLE: hydrogen, acetylene, propane, butane

A non-flammable gas is a compressed gas that is not classified as flammable. Non-flammable gases will not burn but may support combustion.

EXAMPLE: carbon dioxide, oxygen, chlorine

FLAMMABLE LIQUIDS

A flammable liquid is any liquid that has a flash point below 100°F.

EXAMPLE: gasoline, ethylene oxide, ethyl alcohol, toluene.

COMBUSTIBLE LIQUIDS

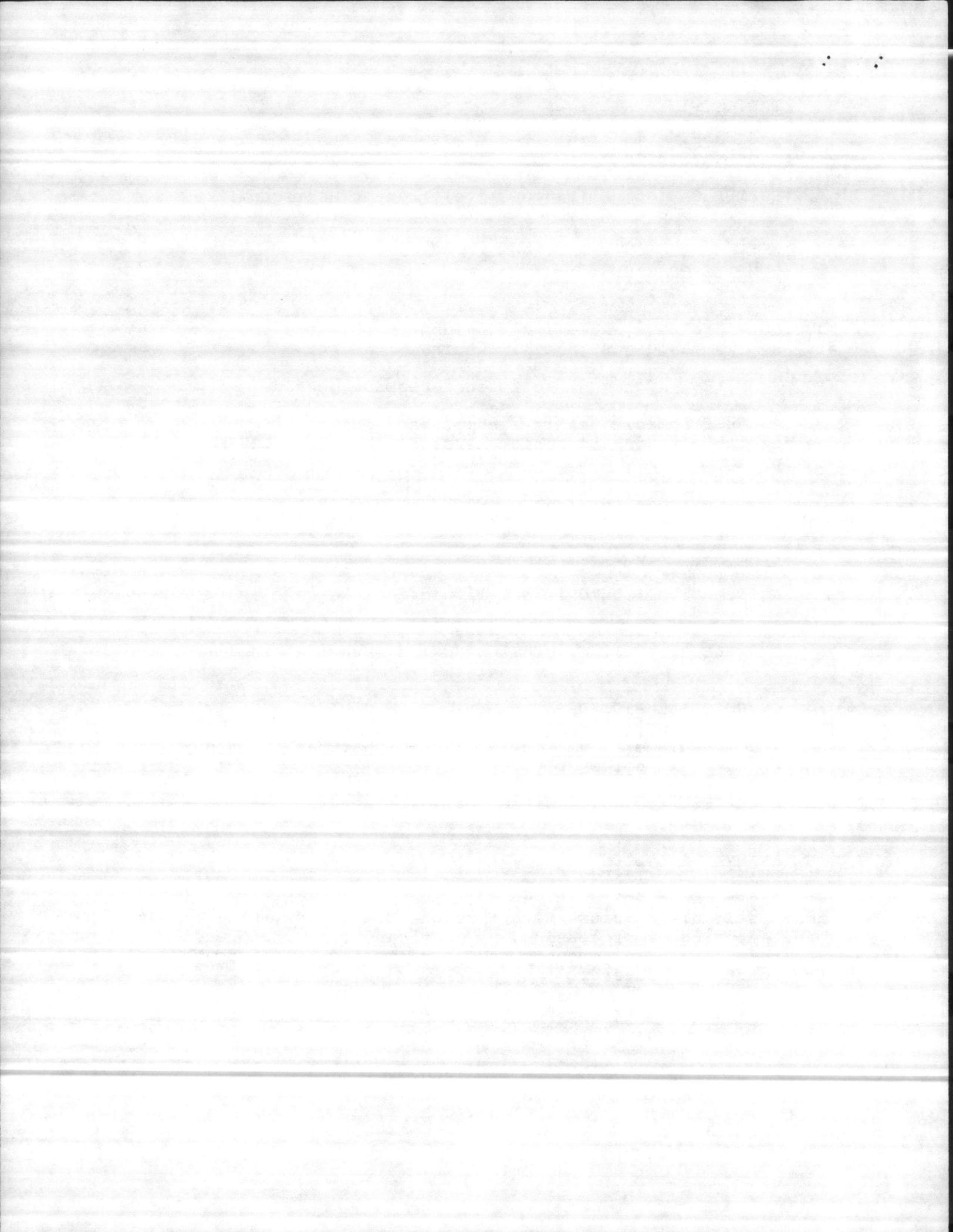
A combustible liquid is any liquid that has a flash point at or above 100°F and below 200°F.

EXAMPLE: fuel oil, diesel oil, stoddard solvent

FLAMMABLE SOLIDS

A flammable solid is any solid material, other than an explosive, that is liable to cause fire through friction or retained heat from manufacturing or processing, or that can be ignited readily, and when ignited burns so vigorously and persistently as to create a serious transportation hazard.

EXAMPLE: white phosphorus (matches)



OXIDIZER

An oxidizer is a substance that yields oxygen readily to stimulate the combustion of organic and inorganic matter.

EXAMPLE: nitric acid, potassium and sodium nitrate, calcium hypochlorite

ORGANIC PEROXIDE

An organic peroxide is an organic derivative of the inorganic compound hydrogen peroxide.

EXAMPLE: benzoyl peroxide, peracetic acid, bleaching peroxides

CORROSIVE MATERIALS

A corrosive material is any liquid or solid that can destroy human skin tissue, or any liquid that has a severe corrosion rate on steel.

EXAMPLES: sulfuric acid, nitric acid, hydrochloric acid

ETIOLOGIC AGENTS

An etiologic agent is a living micro-organism that may cause human disease.

EXAMPLE: biological and virus specimens; e.g., measles or rabies virus

GASOLINE !

3. IGNITION TEMPERATURE - The lowest temperature at which a flammable/combustible material will automatically ignite (even without a flame, spark, etc - ignition source - being present). Gasoline has an ignition temperature of +536°F. to +853°F., depending upon its grade/mixture.
4. SPECIFIC GRAVITY - The weight of a solid or liquid material compared to the weight of an equal volume of water.
 Specific gravity of water = 1.0 = rule or constant
 Specific gravity of gasoline = 0.8 = lighter than water and will float on water
 Specific gravity of carbon disulfide = 1.3 = heavier than water and will sink in water
5. VAPOR DENSITY - The weight of a vapor or gas compared to the weight of an equal volume of air
 Vapor density of air = 1.0 = rule or constant
 Vapor density of gasoline = 3.0 - 4.0 = heavier than air
 Vapor density of methane = 0.6 = lighter than air
6. EVAPORATION - The slow change from a liquid to a vapor at temperatures below the boiling point (molecules being released slowly)
7. BOILING POINT - The fast change from a liquid to a vapor at a certain temperature (molecules being released fast)
 The boiling point of gasoline is between 100°F. and 400°F., depending upon its grade/mixture.
8. VAPOR PRESSURE - A vapor or gas pressure is the impact of molecules against a restraint. Molecules being contained causes a pressure buildup (psi).
 Vapor pressure usually varies with temperature - the higher the temperature the higher the vapor pressure; the lower the temperature the lower the pressure.

The above needs further explanation concerning variables.

