A

Absorbent Material. A material designed to pick up and hold liquid hazardous material to prevent contamination spread. Materials include sawdust, clays, charcoal and polyolefin-type fibers.

Absorption. (1) The process of absorbing or "picking up" a liquid hazardous material to prevent enlargement of the contaminated area. Common physical method for spill control. (2) Movement of a toxicant into the circulatory system by oral, dermal, or inhalation exposure.

ACGIH. (See American Conference of Governmental Industrial Hygienists.)

Activity. The number of radioactive atoms that will decay and emit radiation in 1 second of time. Measured in curies (1 curie = 37 billion disintegrations per second), although it is usually expressed in either millicuries or microcuries. Activity indicates how much radioactivity is present and not how much material is present.

Acute Effects. Results from a single dose or exposure to a material. Signs and symptoms may be immediate or may not be evident for 24 to 72 hours after the exposure.

Acute Exposures. An immediate exposure, such as a single dose that might occur during an emergency response.

Administration/Finance Section. Responsible for all costs and financial actions of the incident. Includes the Time Unit, Procurement Unit, Compensation/Claims Unit, and the Cost Unit.

Adsorption. Process of adhering to a surface. Common method of spill control.

Aerosols. Liquid droplets, or solid particles dispersed in air, that are of fine enough particle size (0.01 to 100 microns) to remain dispersed for a period of time.

Agency for Toxic Substances and Disease Registry (ATSDR). An organization within the Center for Disease Control, it is the lead federal public health agency for hazmat incidents and operates a 24-hour emergency number for providing advice on health issues involving hazmat releases.

Air Monitoring. To measure, record, and/or detect contaminants in ambient air.

Air Purifying Respirators (APR). Respirators or filtration devices which remove particulate matter, gases, or vapors from the atmosphere. These devices range from full-facepiece, dual-cartridge masks with eye protection, to half-mask, facepiece-mounted cartridges. They are intended to be used only in atmospheres where the chemical hazards and concentrations are known.

American Conference of Governmental Industrial Hygienists (ACGIH). A professional society of individuals responsible for full-time industrial hygiene programs who are employed by official governmental units. Its primary function is to encourage the interchange of experience among governmental industrial hygienists and to collect and make information available of value to them. ACGIH promotes standards and techniques in industrial hygiene and coordinates governmental activities with community agencies.

American National Standards Institute (ANSI). Serves as a clearinghouse for nationally coordinated voluntary safety, engineering, and industrial consensus standards developed by trade associations, industrial firms, technical societies, consumer organizations, and government agencies.
American Petroleum Institute (API). Professional trade association of the United States petroleum industry. Publishes technical standards and information for all areas of the industry, including exploration, production, refining, marketing, transportation, and fire and safety.
Anhydrous. Free from water, dry. For example, anhydrous ammonia, anhydrous hydrogen chloride.
API Uniform Marking System. American Petroleum Institute marking system used at many petroleum storage and marketing facilities to identify hydrocarbon pipelines and transfer points. Classified hydrocarbon fuels and blends into leaded and unleaded gasoline (regular, premium, super). gasoline additives (methyl tertiary butyl ether) and distillates, and fuel oils.
Area of Refuge. Area within the hot zone where exposed or contaminated personnel are protected from further contact and/or exposure. This is a “holding area” where personnel are controlled until they can be safely decontaminated or treated.
Aromatic Hydrocarbons. A hydrocarbon which contains the benzene “ring” which is formed by six carbon atoms and contains resonant bonds. Examples include benzene (C^6H^6) and toluene (C^7H^8).
Asphyxiation Harm Events. Those events related to oxygen deprivation and/or asphyxiation within the body. Asphyxiants can be classified as simple or chemical.
Association of American Railroads (AAR). Professional trade association which coordinates technical information and research within the United States railroad industry. Publisher of emergency response guidebooks.
Atmosphere-supplying Devices. Respiratory protection devices coupled to an air source. The two types are self-contained breathing apparatus (SCBA) and supplied air respirators (SAR).

B

B-End. The end of a railroad car where the handbrake is located. Is typically used as the initial reference point when communicating railroad car damage.
Boiling Liquid Expanding Vapor Explosion (BLEVE). A container failure with a release of energy, often rapidly and violently, which is accompanied by a release of gas to the atmosphere and propulsion of the container or container pieces due to an overpressure rupture.
Boiling Point. The temperature at which a liquid changes its phase to a vapor or gas. The temperature where the vapor pressure of the liquid equals atmospheric pressure. Significant property for evaluating the flammability of a liquid, as flash point and boiling point are directly related. A liquid with a low flash point will also have a low boiling point, which translates into a large amount of vapors being given off.

Bonding. A method of controlling ignition hazards from static electricity. The process of connecting two or more conductive objects together by means of a conductor; it is done to minimize potential differences between conductive objects.
Boom. A floating physical barrier serving as a continuous obstruction to the spread of a contaminant.
Branch. That organizational level within the Incident Management System having functional/geographic responsibility for major segments of incident operations (e.g., Hazmat Branch). The Branch level is organizationally between Section and Division/Sector/Group.
Breach Event. The event causing a hazmat container to open up or "breach." It occurs when a container is stressed beyond its limits of recovery (ability to hold contents). Different containers breach in different ways—disintegration, runaway cracking, failure of container attachments, container punctures, and container splits or tears.
Breakthrough Time. The elapsed time between initial contact of the hazardous chemical with the outside surface of a barrier, such as protective clothing material, and the time at which the chemical can be detected at the inside surface of the material.
Buddy System. A system of organizing employees into work groups in such a manner that each employee of the work group is designated to be observed by at least one other employee in the work group (per OSHA 1910.120 (a)(3)).
Bulk Packaging. Bulk packaging has an internal volume greater than 119 gallons (450 liters) for liquids, a capacity greater than 882 pounds (400 kg) for solids, or a water capacity greater than 1,000 pounds (453.6 kg) for gases. It can be an integral part of a transport vehicle (e.g., cargo tank truck, railroad tank car, and barges), packaging placed on, or in a transport vehicle (e.g., portable tanks, intermodal portable tanks, ton containers), or fixed on processing containers.
Bung. A plug used to close a barrel or drum bung hole.

C

CAA. (See the Clean Air Act.)
Canadian Transport Emergency Center (CANUTEC). Operated by Transport Canada, it is a 24-hour, government sponsored hot line for chemical emergencies. (The Canadian version of CHEMTREC.)
Cancer. A process in which cells undergo some change that renders them abnormal. They begin a phase of uncontrolled growth and spread.
Carboy. Glass or plastic bottles used for the transportation of liquids. Range in capacity to over 20 gallons. May be encased in an outer packaging, such as polystyrene boxes, wooden crates, or plywood drums. Often used for the shipment of corrosives.
Carcinogen. A material that can cause cancer in an organism. May also be referred to as "cancer suspect" or "known carcinogens."
Cargo Tanks. Tanks permanently mounted on a tank truck or tank trailer which is used for the transportation of liquefied and compressed gases, liquids, and

molten materials. Examples include MC-306, DOT-406, MC-307/DOT-407, MC-312/DOT-412, MC-331, and MC-338. May also be any bulk liquid or compressed gas packaging not permanently attached to a motor vehicle which (because of its size, construction, or attachment to the vehicle, can be loaded or unloaded without being removed from the vehicle.

CAS Number. The Chemical Abstract Service number. Often used by state and local Right-to-Know regulations for tracking chemicals in the workplace and the community. Sometimes referred to as a chemical's "social security number." Sequentially assigned CAS numbers identify specific chemicals and have no chemical significance.

Catalyst. Used to control the rate of a chemical reaction by either speeding it up or slowing it down. If used improperly, catalysts can speed up a reaction and cause a container failure due to pressure or heat build-up.

Center for Disease Control (CDC). The federally funded research organization tasked with disease control and research.

Chemical Degradation. The altering of the chemical structure of a hazmat during the process of decontamination. Commonly used agents include sodium hypochlorite (household bleach) and sodium hydroxide.

Chemical Interactions. Reaction caused by mixing two or more chemicals together. Chemical interaction of materials within a container may result in a build-up of heat and pressure, leading to container failure. In other situations, the combined material may be more corrosive than the container was originally designed to withstand and cause the container to breach.

Chemical Manufacturers Association. Professional trade association of the United States chemical industry. The parent organization that operates CHEMTREC™.

Chemical Protective Clothing (CPC). Single or multi-piece garment constructed of chemical protective clothing materials designed and configured to protect the wearer's torso, head, arms, legs, hands, and feet. Can be constructed as a single or multi-piece garment. The garment may completely enclose the wearer either by itself or in combination with the wearer's respiratory protection, attached or detachable hood, gloves, and boots.

Chemical Protective Clothing Material. Any material or combination of materials used in an item of clothing for the purpose of isolating parts of the wearer's body from contact with a hazardous chemical.

Chemical Resistance. The ability to resist chemical attack. The attack is dependent on the method of test and its severity is measured by determining the changes in physical properties. Time, temperature, stress, and reagent may all be factors that affect the chemical resistance of a material.

Chemical Resistant Materials. Materials that are specifically designed to inhibit or resist the passage of chemicals into and through the material by the processes of penetration, permeation, or degradation.

Chemical Stress. The result of a chemical reaction of two or more materials. Examples include corrosive materials attacking a metal, the pressure or heat generated by the decomposition or polymerization of a substance, or any variety of corrosive actions.

Chemical Transportation Emergency Center (CHEMTREC™). The Chemical Transportation Center, operated by the Chemical Manufacturers Association

(CMA), can provide information and technical assistance to emergency responders. (Phone number: 1-800-424-9300)

Chemical Vapor Protective Clothing. The garment portion of a chemical protective clothing ensemble that is designed and configured to protect the wearer against chemical vapors or gases. Vapor chemical protective clothing must meet the requirements of NFPA 1991. This type of protective clothing is a component of EPA Level A chemical protection.

Chlorine Emergency Plan (CHLOREP). Chlorine industry emergency response system operated by the Chlorine Institute and activated through CHEMTREC.

Chlorine Kits. Standardized leak control kits used for the control of leaks in chlorine cylinders (Chlorine A kit), 1 ton cylinders (Chlorine B kit), and tank cars, tank trucks, and barges (Chlorine C kit). These kits are commercially available and are built to specifications developed by the Chlorine Institute.

Chronic Effects. Result from a single exposure or from repeated doses or exposures over a relatively long period of time.

Chronic Exposures. Low exposures repeated over time.

Clandestine Laboratory. An operation consisting of a sufficient combination of apparatus and chemicals that either have been or could be used in the illegal manufacture/synthesis of controlled substances.

Classes. As used in NFPA 70, *The National Electric Code*, used to describe the type of flammable materials that produce the hazardous atmosphere. There are three classes:

Class I Locations—Flammable gases or vapors may be present in quantities sufficient to produce explosive or ignitible mixtures.

Class II Locations—Concentrations of combustible dusts may be present (e.g., coal or grain dust).

Class III Locations—Areas concerned with the presence of easily ignitible fibers or flyings (e.g., cotton milling).

Clean Air Act (CAA). Federal legislation which resulted in EPA regulations and standards governing airborne emissions, ambient air quality, and risk management programs.

Clean Water Act (CWA). Federal legislation which resulted in EPA and state regulations and standards governing drinking water quality, pollution control, and enforcement. The Oil Pollution Act (OPA) amended the CWA and authorized regulations pertaining to oil spill preparedness, planning, response, and clean-up.

Cleanup. Incident scene activities directed toward removing hazardous materials, contamination, debris, damaged containers, tools, dirt, water, and road surfaces in accordance with proper and legal standards and returning the site to as near a normal state as existed prior to the incident.

Code of Federal Regulations (CFR). A collection of regulations established by federal law. Contact with the agency that issues the regulation is recommended for both details and interpretation.

COFC. (See container-on-flat-car.)

Cold Zone. The control zone of a hazmat incident that contains the command post and other support functions as are deemed necessary to control the

incident. This zone may also be referred to as the clean zone or the support zone.

Coliwasa (Composite Liquid Waste Sampler). A glass or plastic waste sampling kit commonly used for collecting samples from drums and other containerized wastes.

Colorimetric Tubes. Glass tubes containing a chemically treated substrate that reacts with specific airborne chemicals to produce a distinctive color. The tubes are calibrated to indicate approximate concentrations in air.

Combination Package. Packaging consisting of one or more inner packagings and a non-bulk outer packaging. There are many different types of combination packagings.

Combined Liquid Waste Sampler (Coliwasa). A tool designed to provide stratified sampling of a liquid container.

Combined Sewers. Carries domestic wastewater as well as stormwater and industrial wastewater. It is quite common in older cities to have an extensive amount of these systems. Combined sewers may also have regulators or diversion structures that allow overflow directly to rivers or streams during major storm events.

Command. The act of directing, ordering, and/or controlling resources by virtue of explicit legal, agency, or delegated authority.

Command Post. The location from which all incident operations are directed and planning functions are performed. The communications center is often incorporated into the command post.

Command Staff. The command staff consists of the Public information Officer, the Safety Officer, and the Liaison Officer, who report directly to the Incident Commander.

Community Awareness and Emergency Response (CAER). A program developed by the Chemical Manufacturers Association (CMA) to provide guidance for chemical plant managers to assist them in developing integrated hazmat emergency response plans between the plant and the community.

Compatibility. The matching of protective chemical clothing to the hazardous material involved to provide the best protection for the worker.

Compatibility Charts. Permeation and penetration data supplied by manufacturers of chemical protective clothing to indicate chemical resistance and breakthrough time of various garment materials as tested against a battery of chemicals. These test data should be in accordance with ASTM and NFPA standards.

Composite Packaging. Packaging consisting of an inner receptacle, usually made of glass, ceramic, or plastic, and an outer protection (e.g., sheet metal, fiberboard, etc.) so constructed that the receptacle and the outer package form an integral packaging for transport purposes. Once assembled, it remains an integral single unit.

Compound. Chemical combination of two or more elements, either the same elements or different ones, that is electrically neutral. Compounds have a tendency to break down into their component parts, sometimes explosively.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Known as CERCLA or SUPERFUND, it addresses hazardous substance releases into the environment and the clean-up of inactive hazardous

waste sites. It also requires those who release hazardous substances, as defined by the Environmental Protection Agency (EPA), above certain levels (known as “reportable quantities”) to notify the National Response Center.

Compressed Gas. Any material or mixture having an absolute pressure exceeding 40 psi in the container at 70°F, having an absolute pressure exceeding 104 psi at 130°F, or any liquid flammable material having a vapor pressure exceeding 40 psi at 100°F as determined by testing. Also includes cryogenic liquids with boiling points lower than 130°F at 1 atmosphere.

Computer Aided Management of Emergency Operations (CAMEO). A computer data base storage-retrieval system of pre-planning and emergency data for on-scene use at hazardous materials incidents.

Computerized Telephone Notification System (CT/NS). A computerized autodial telephone system which can be used for notifying a potentially large number of people in a short period of time. CT/NS systems are often used around high hazard facilities to ensure the timely notification of nearby citizens. Systems are capable of making call-backs to unanswered phones, keeping track of both who is notified and the time of notification, and providing pre-recorded messages and instructions to residents.

Concentration. The percentage of an acid or base dissolved in water. Concentration is *not* the same as strength.

Confined Space. A space that (1) is large enough and so configured that an employee can bodily enter and perform assigned work; (2) has limited or restricted means for entry or exit (e.g., tanks, vessels, silos, storage bins, hoopers, vaults, and pits are spaces that may have limited means of entry); and (3) is not desinged for continuous employee occupancy.

Confined Space (Permit Required). Has one or more of the following characteristics:

1) Contains or has the potential to contain a hazardous atmosphere. A hazardous atmosphere would be created by any of the following, including:

a) Vapors exceed 10% of the lower explosive limit (LEL).
b) Airborne combustible dust exceeds its LEL.
c) Atmospheric oxygen concentrations below 19.5% or above 23.5%.
d) Atmospheric concentration of any substance for which a dose or PEL is published and which could result in employee exposure in excess of these values.
e) Any other atmospheric condition which is immediately dangerous to life or health (IDLH).

2) Contains a material that has the potential for engulfing an entrant.
3) Has an internal configuration such that a person could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross section; or
4) Contains any other recognized serious safety or health hazard.

Confinement. Procedures taken to keep a material in a defined or localized area once released.

Consignee. Person or company to which a material is being shipped.

Consist. A railroad shipping document that lists the order of cars in a train.

Contact. Being exposed to an undesirable or unknown substance that may pose a threat to health and safety.

Container. Any vessel or receptacle that holds a material, including storage vessels, pipelines, and packaging. Includes both bulk and nonbulk packaging, and fixed containers.
Container-on-Flat-Car (COFC). Intermodal containers which are shipped on a railroad flat cars.
Containment. Actions necessary to keep a material in its container (e.g., stop a release of the material or reduce the amount being released).
Contaminant. A hazardous material that physically remains on or in people, animals, the environment, or equipment, thereby creating a continuing risk of direct injury or a risk of exposure outside of the hot zone.
Contamination. An uncontained substance or process that poses a threat to life, health, or the environment.
Control. The offensive or defensive procedures, techniques, and methods used in the mitigation of a hazardous materials incident, including containment, extinguishment, and confinement.
Control Zones. The designation of areas at a hazardous materials incident based upon safety and the degree of hazard. Many terms are used to describe these control zones; however, for the purposes of this text, these zones are defined as the hot, warm, and cold zones.
Controlled Burn. Defensive or nonintervention tactical objective by which a fire is allowed to burn with no effort to extinguish the fire. In some situations, extinguishing a fire will result in large volumes of contaminated runoff or threaten the safety of emergency responders. Consult with the appropriate environmental agencies when using this method.
Corrosive. A material that causes visible destruction of, or irreversible alterations to, living tissue by chemical action at the point of contact.
Corrosivity Harm Events. Those events related to severe chemical burns and/or tissue damage from corrosive exposures.
Crack. Narrow split or break in the container metal which may penetrate through the container metal (may also be caused by fatigue). It is a major mechanism which could cause catastrophic failure.
Crisis. An unplanned event that can exceed the level of resources, has the potential to significantly impact an organization's operability and credibility, or poses a significant environmental, economic, or legal liability.
Critical Temperature and Pressure. Critical temperature is the minimum temperature at which a gas can be liquefied no matter how much pressure is applied. Critical pressure is the pressure that must be applied to bring a gas to its liquid state. Both terms relate to the process of liquefying gases. A gas cannot be liquefied above its critical temperature. The lower the critical temperature, the less pressure required to bring a gas to its liquid state.
Critique. An element of incident termination which examines the overall effectiveness of the emergency response effort and develops recommendations for improving the organization's emergency response system.
Cryogenic Liquids. A gas with a boiling point of minus 150°F or lower. Cryogenic liquid spills will vaporize rapidly when exposed to the higher ambient temperatures outside of the container. Expansion ratios for common cryogenics range from 694 (nitrogen) to 1,445 (neon) to 1.

D

Dam. A defensive confinement procedure consisting of constructing a dike or embankment to totally immobilize a flowing waterway contaminated with a liquid or solid hazardous substance.

Damage Assessment. The process of gathering and evaluating container damage as a result of a hazmat incident.

Dangerous Cargo Manifest. A list of the hazardous materials carried as cargo on board a vessel. Includes the location of the hazmat on the vessel.

Dangerous Goods. In Canadian transportation, hazardous materials are referred to as "dangerous goods."

Debriefing. An element of incident termination which focuses on the following factors:

1) Informing responders exactly what hazmats they were (possibly) exposed to and the signs and symptoms of exposure.
2) Identifying damaged equipment requiring replacement or repair.
3) Identifying equipment or supplies requiring specialized decontamination or disposal.
4) Identifying unsafe work conditions.
5) Asking information gathering responsibilities for a post-incident analysis.

Decon. Popular abbreviation referring to the process of decontamination.

Decontamination. The physical and/or chemical process of reducing and preventing the spread of contamination from persons and equipment used at a hazardous materials incident. (Also referred to as "contamination reduction.")

Decontamination Corridor. A distinct area within the "Warm Zone" that functions as a protective buffer and bridge between the "Hot Zone" and the "Cold Zone," where decontamination stations and personnel are located to conduct decontamination procedures.

Decontamination Officer. A position within the Hazmat Branch which has responsibility for identifying the location of the decontamination corridor, assigning stations, managing all decontamination procedures, and identifying the types of decontamination necessary.

Decontamination Team (Decon-Team). A group of personnel and resources operating within a decontamination corridor.

Defensive Tactics. These are less aggressive spill and fire control tactics where certain areas may be "conceded" to the emergency, with response efforts directed toward limiting the overall size or spread of the problem.

Degradation. The physical destruction or decomposition of a clothing material due to exposure to chemicals, use, or ambient conditions (i.e., storage in sunlight). Degradation is noted by visible signs such as charring, shrinking, swelling, color change or dissolving, or by testing the clothing material for weight changes, loss of fabric tensile strength, etc.

Degree of Solubility. An indication of the solubility and/or miscibility of the material.

Negligible—less than 0.1%
Slight—0.1 to 1.0%
Moderate—1 to 10%
Appreciable—greater than 10%
Complete—soluble at all proportions

Dent. Deformation of the tank head or shell. It is caused from impact with a relatively blunt object (e.g., railroad coupler, vehicle). If the dent has a sharp radius, there is the possibility of cracking.

Dermatotoxins. Toxins of the skin which may act as irritants, ulcers, chloracne or cause skin pigmentation disorders (e.g., halogenated hydrocarbons, coal tar compounds).

Detonation. An explosive chemical reaction with a release rate less than 1/100th of a second. This gives responders *no* time to react. Examples include military munitions, dynamite, and organic peroxides.

Dike. A defensive confinement procedure consisting of an embankment or ridge on ground used to control the movement of liquids, sludges, solids, or other materials. Barrier which prevents passage of a hazmat to an area where it will produce more harm.

Dike—Overflow. A dike constructed in a manner that allows uncontaminated water to flow unobstructed over the dike while keeping the contaminant behind the dike.

Dike—Underflow. A dike constructed in a manner that allows uncontaminated water to flow unobstructed under the dike while keeping the contaminant behind the dike.

Dilution. Application of water to water-miscible hazmats to reduce to safe levels the hazard they represent. It can increase the total volume of liquid which will have to be disposed of. In decon applications, it is the use of water to flush a hazmat from protective clothing and equipment, and it is the most common method of decon.

Direct Contact. Direct skin contact with some chemicals, such as corrosives, will immediately damage skin or body tissue upon contact.

Direct-Reading Instruments. Provide information at the time of sampling. They are used to detect and monitor flammable or explosive atmospheres, oxygen deficiency, certain gases and vapors, and ionizing radiation.

Dispersants. The use of certain chemical agents to disperse or break down liquid hazmat spills. The use of dispersants may result in spreading the hazmat over a larger area. Dispersants are often applied to hydrocarbon spills, resulting in oil-in-water emulsions and diluting the hazmat to acceptable levels. Use of dispersants may require prior approval of the appropriate environmental agencies.

Dispersion. To spread, scatter, or diffuse through air, soil, surface, or groundwater.

Diversion. A defensive confinement procedure to intentionally control the movement of a hazardous material into an area where it will pose less harm to the community and the environment.

Divisions. As used in NFPA 70, *The National Electric Code*, describe the types of location that may generate or release a flammable material. There are two divisions:

> **Division I—**Location where the vapors, dusts, or fibers are continuously generated and released. The only element necessary for a hazardous situation is a source of ignition.
>
> **Division II**—Location where the vapors, dusts, or fibers are generated and released as a result of an emergency or a failure in the containment system.

Dome. Circular fixture on the top of a pressurized railroad tank car containing valves, pressure relief valve, and gauging devices.

Dose. The amount of a substance ingested, absorbed, and/or inhaled during an exposure period.

Dose–Response Relationship. Basic principle of toxicology. The intensity of a response elicited by a chemical within a biologic mechanism is a function of the administered dose.

Doublegloving. Involves the use of latex surgical gloves under a work glove. It permits the wearing of the work glove without compromising exposure protection and also provides an additional barrier for hand protection. Doublegloving also reduces the potential for hand contamination when removing protective clothing during decon procedures.

Drums. Cylindrical packagings used for liquids and solids. Constructed of plastic, metal, fiberboard, plywood, or other suitable materials. Typical drum capacities range up to 55 gallons.

E

Element. Pure substance that cannot be broken down into simpler substances by chemical means.

Elevated Temperature Materials. Materials which, when offered for transportation in a bulk container, are (1) liquids at or above 212°F (100°C); (2) Liquids with a flash point at or above 100°F (37.8°C) that are intentionally heated and are transported at or above their flash point; and (3) solids at a temperature at or above 464°F (240°C).

Emergency Breathing Apparatus (EBA). Short duration (e.g., 5–10 minutes) respiratory protection devices developed for use by the general public. Typically consist of a small breathing air cylinder and a clear plastic hood assembly which is placed over the head of the wearer to provide a fresh breathing air supply.

Emergency Broadcast System (EBS). The national emergency notification system that uses commercial AM and FM radio stations for emergency broadcasts. The EBS is usually initiated and controlled by Emergency Management agencies.

Emergency Contact. The telephone number for the shipper or shipper's representative that may be accessed 24 hours a day, 7 days a week in the event of an accident.

Emergency Decontamination. The physical process of immediately reducing contamination of individuals in potentially life-threatening situations without the formal establishment of a decontamination (or contamination reduction) corridor.

Emergency Medical Services (EMS). Functions as required to provide emergency medical care for ill or injured persons by trained providers.

Emergency Operations Center (EOC). The secured site where government or facility officials exercise centralized direction and control in an emergency. The EOC serves as a resource center and coordination point for additional field assistance. It also provides executive directives to and liaison for government and other external representatives, and it considers and mandates protective actions.

Emergency Response. Response to any occurrence which has or could result in a release of a hazardous substance.

Emergency Response Organization. An organization that utilizes personnel trained in emergency response. This would include fire, law enforcement, EMS, and industrial emergency response teams.

Emergency Response Personnel. Personnel assigned to organizations that have the responsibility for responding to different types of emergency situations.

Emergency Response Plan. A plan that establishes guidelines for handling hazmat incidents as required by regulations such as SARA, Title III and HAZWOPER (29 CFR 1910.120).

Emergency Response Planning Guidelines (ERPG-2). The maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to one hour without experiencing or developing irreversible or

serious health effects or symptoms which could impair an individual's ability to take protective action.

Emergency Response Team (ERT). Crews of specially trained personnel used within industrial facilities for the control and mitigation of emergency situations. May consist of both shift personnel with ERT responsibilities as part of their job assignment (e.g., plant operators) or volunteer members. ERT's may be responsible for fire, hazmat, medical, and technical rescue emergencies depending upon the size and operation of the facility.

Emergency Traffic. A priority radio message to be immediately broadcast throughout the emergency scene.

Endothermic. A process or chemical reaction which is accompanied by the absorption of heat.

Engulfing Event. Once the hazmat and/or energy is released, it is free to travel or disperse, engulfing an area. The farther the contents move outward from their source, the greater the level of problems. How quickly they move and how large an area they engulf will depend upon the type of release, the nature of the hazmat, the physical and chemical laws of science, and the environment.

Environmental Protection Agency (EPA). The purpose of the EPA is to protect and enhance our environment today and for future generations to the fullest extent possible under the laws enacted by Congress. The Agency's mission is to control and abate pollution in the areas of water, air, solid waste, pesticides, noise, and radiation. EPA's mandate is to mount an integrated, coordinated attack on environmental pollution in cooperation with state and local governments.

EPA. (See Environmental Protection Agency.) *EPA Levels of Protection*. EPA system for classifying levels of chemical protective clothing.

Level A: Chemical vapor protective suit.
Level B: Chemical liquid splash protective suit with SCBA.
Level C: Chemical liquid splash protective suit with air purifying respirator.

EPA Registration Number. Required for all agricultural chemical products marketed within the United States. It is one of three ways to positively identify an ag chemical. The others are by the product name or chemical ingredient statement. The registration number will appear as a two- or three-section number.

Etiological Harm Events. Those harm events created by uncontrolled exposures to living microorganisms. Diseases commonly associated with etiological harm include hepatitis, typhoid, and tuberculosis. It is often difficult to detect when and where the physical exposure to the etiological agent occurred and the route(s) of exposure.

Evacuation. A public protective option which results in the removal of fixed facility personnel and the public from a threatened area to a safer location. It is typically regarded as the controlled relocation of people from an area of known danger or unacceptable risk to a safer area, or one in which the risk is considered to be acceptable.

Expansion Ratio. The amount of gas produced by the evaporation of one volume of liquid at a given temperature. Significant property when evaluating liquid and vapor releases of liquefied gases and cryogenic materials. The

greater the expansion ratio, the more gas that is produced and the larger the hazard area.

Explosion-Proof Construction. Encases the electrical equipment in a rigidly built container so that (1) it withstands the internal explosion of a flammable mixture, and (2) prevents propagation to the surrounding flammable atmosphere. Used in Class I, Division 1 atmospheres at fixed installations.

Exposure. The subjection of a person to a toxic substance or harmful physical agent through any route of entry (e.g., inhalation, ingestion, skin absorption, or direct contact).

Exposures. Items which may be impinged upon by a hazmat release. Examples include people (civilians and emergency responders), property (physical and environmental), and systems disruption.

Exothermic. A process or chemical reaction which is accompanied by the evolution of heat.

Extremely Hazardous Substances (EHS). Chemicals determined by the Environmental Protection Agency to be extremely hazardous to a community during an emergency spill or release as a result of their toxicities and physical/chemical properties (U.S. Environmental protection Agency, 40 CFR 355).

F

Failure of Container Attachments. Attachments which open up or break off the container, such as safety relief valves, frangible disks, fusible plugs, discharge valves, or other related appliances.

Fire Entry Suits. Suits which offer complete, effective protection for short-duration entry into a total flame environment. Designed to withstand exposures to radiant heat levels up to 2,000°F. Entry suits consist of a coat, pants, and separate hood assembly. They are constructed of several layers of flame-retardant materials, with the outer layer often aluminized.

First Responder. The first trained person(s) to arrive at the scene of a hazardous materials incident. May be from the public or private sector of emergency services.

First Responder, Awareness Level. Individuals who are likely to witness or discover a hazardous substance release who have been trained to initiate an emergency response sequence by notifying the proper authorities of the release. They would take no further action beyond notifying the authorities of the release.

First Responder, Operations Level. Individuals who respond to releases or potential releases of hazardous substances as part of the initial response to the site for the purpose of protecting nearby persons, property, or the environment from the effects of the release. They are trained to respond in a defensive fashion without actually trying to stop the release. Their function is to contain the release from a safe distance, keep it from spreading, and prevent exposures.

Flammable (Explosive) Range. The range of gas or vapor concentration (percentage by volume in air) that will burn or explode if an ignition source is present. Limiting concentrations are commonly called the “lower flammable (explosive) limit” and the “upper flammable (explosive) limit.” Below the lower flammable limit, the mixture is too lean to burn; above the upper flammable limit,

the mixture is too rich to burn. If the gas or vapor is released into an oxygen enriched atmosphere, the flammable range will expand. Likewise, if the gas or vapor is released into an oxygen-deficient atmosphere, the flammable range will contract.

Flaring. Controlled burning of a high vapor pressure liquid or compressed gas in order to reduce or control the pressure and/or dispose of the product.

Flash Point. Minimum temperature at which a liquid gives off enough vapors that will ignite and flashover but will not continue to burn without the addition of more heat. Significant in determining the temperature at which the vapors from a flammable liquid are readily available and may ignite.

Form. Refers to the physical form of a material—solid, liquid, or gas. Significant factor in evaluating both the hazards of a material and tactics for controlling a release. In general, gases and vapor releases cause the greatest problems for emergency responders.

Full Protective Clothing. Protective clothing worn primarily by firefighters which includes helmet, fire-retardant hood, coat, pants, boots, gloves, PASS device, and self-contained breathing apparatus designed for structural fire fighting. It does not provide specialized chemical splash or vapor protection.

Fumes. Airborne dispersion consisting of minute solid particles arising from the heating of a solid material (e.g., lead), indistinction to a gas or vapor. This physical change is often accompanied by a chemical reaction, such as oxidation. Odorous gases and vapors should not be referred to as vapors.

G

Gelation. The process of forming a gel. Gelling agents are used on some hazmat spills to produce a gel that is more easily cleaned up.

Gouge. Reduction in the thickness of the tank shell. It is an indentation in the shell made by a sharp, chisel-like object. A gouge is characterized by the cutting and complete removal of the container or weld material along the track of contact.

Gross Decontamination. The initial phase of the decontamination process during which the amount of surface contaminant is significantly reduced. This phase may include mechanical removing and initial rinsing.

Grounding. A method of controlling ignition hazards from static electricity. The process of connecting one or more conductive objects to the ground; it is done to minimize potential differences between objects and the ground.

Groups. As used in NFPA 70, *The National Electric Code*, are products within a Class. Class I is divided into four groups (Groups A–D) on the basis of similar flammability characteristics. Class II is divided into three groups (Groups E–G). There are no groups for Class III materials.

H

Half-Life. The time it takes for the activity of a radioactive material to decrease to one half of its initial value through radioactive decay.

Halogenated Hydrocarbons. A hydrocarbon with halogen atom (e.g., chlorine, fluorine, bromine, etc.) substituted for a hydrogen atom. They are often more

toxic than naturally occurring organic chemicals, and they decompose into smaller, more harmful elements when exposed to high temperatures for a sustained period of time.

Harm Event. Pertains to the harm caused by a hazmat release. Harm events include thermal, radiation, asphyxiation, toxicity, corrosivity, etiologic, and mechanical.

Hazard. Refers to a danger or peril. In hazmat operations, usually refers to the physical or chemical properties of a material.

Hazard Analysis. Part of the planning process, it is the analysis of hazmats present in a facility or community. Elements include hazards identification, vulnerability analysis, risk analysis, and evaluation of emergency response resources. Hazards analysis methods used as part of Process Safety Management (PSM) include HAZOP Studies, Fault Tree Analysis, and What If Analysis.

Hazard and Risk Evaluation. Evaluation of hazard information and the assessment of the relative risks of a hazmat incident. Evaluation process leads to the development of Incident Action Plan.

Hazard Class. The hazard class designation for the material as found in the Department of Transportation regulations, 49 CFR. There are currently 9 DOT hazard classes which are divided into 22 divisions.

Hazard Communication (HAZCOM). OSHA regulation (29 CFR 1910.1200) which requires hazmat manufacturers to develop MSDS's on specific types of hazardous chemicals and provide hazmat health information to both employees and emergency responders.

Hazardous Chemicals. Any chemical that would be a risk to employees if exposed in the workplace (U.S. Occupational Safety and Health Administration, 29 CFR 1910).

Hazardous Materials. Any substance or material in any form or quantity capable of posing an unreasonable risk to safety and health and property when transported in commerce (U.S. Department of Transportation, 40 CFR 171).

Hazardous Materials General Behavior Model (GHMBMO). Process for visualizing hazmat behavior. Applies the concept of events analysis which is simply breaking down the overall incident into smaller, more easily understood parts for purposes of analysis.

Hazardous Materials Response Team (HMRT). An organized group of employees, designated by the employer, who are expected to perform work to handle and control actual or potential leaks or spills of hazardous substances requiring possible close approach to the substance. A Hazmat Team may be a separate component of a fire brigade or a fire department or other appropriately trained and equipped units from public or private agencies.

Hazardous Materials Specialists. Individuals who respond and provide support to Hazardous Materials Technicians. While their duties parallel those of the Technician, they require a more detailed or specific knowledge of the various substances they may be called upon to contain. Would also act as a liaison with federal, state, local, and other governmental authorities in regards to site activities.

Hazardous Materials Technicians. Individuals who respond to releases or potential releases of hazardous materials for the purposes of stopping the leak.

They generally assume a more aggressive role in that they are able to approach the point of a release in order to plug, patch, or otherwise stop the release of a hazardous substance.

Hazardous Substances. Any substance designed under the Clean Water Act and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) as posing a threat to waterways and the environment when released (U.S. Environmental Protection Agency, 40 CFR 302). Hazardous substances as used within OSHA 1910.120 refer to every chemical regulated by EPA as a hazardous substance and by DOT as a hazardous material.

Hazardous Waste Manifest. Shipping form required by the EPA and DOT for all modes of transportation when transporting hazardous wastes for treatment, storage, or disposal.

Hazardous Wastes. Discarded materials regulated by the Environmental Protection Agency because of public health and safety concerns. Regulatory authority is granted under the Resource Conservation and Recovery Act (RCRA). (U.S. Environmental Protection Agency, 40 CFR 260–281.)

Hazmat. Acronym used for hazardous materials.

Hazmat Branch. Responsible for all hazmat operations which occur at a hazmat incident. Functions include safety, site control, information, entry, decontamination, hazmat medical, and hazmat resources.

Hazmat Branch Director. Officer responsible for the management and coordination of all functional responsibilities assigned to the Hazmat Branch. Must have a high level of technical knowledge and be knowledgeable of both the strategical and tactical aspects of hazmat response. Reports to the Operations Section Chief.

Hazmat Entry Function. Responsible for all entry and back-up operations within the Hot Zone, including reconnaissance, monitoring, sampling, and mitigation.

Hazmat Decontamination Function. Responsible for the research and development of the decon plan, set-up, and operation of an effective decontamination area capable of handling all potential exposures, including entry personnel, contaminated patients, and equipment.

Hazmat Information Function. Responsible for gathering, compiling, coordinating, and disseminating all data and information relative to the incident. This data and information will be used within the Hazmat Branch for assessing hazard and evaluating risks, evaluating public protective options, selecting the PPE, and developing the incident action plan.

Hazmat Medical Function. Responsible for pre- and post-entry medical monitoring and evaluation of all entry personnel, and provides technical medical guidance to the Hazmat Branch as requested.

Hazmat Resource Function. Responsible for control and tracking of all supplies and equipment used by the Hazmat Branch during the course of an emergency, including documenting the use of all expendable supplies and materials. Coordinates, as necessary, with the Logistics Section Chief.

Hazmat Safety Function. Primarily the responsibility of the Incident Safety Officer and the Hazmat Safety Officer. Responsible for ensuring that safe and accepted practices and procedures are followed throughout the course of the

incident. Possesses both the authority and responsibility to stop any unsafe actions and correct unsafe practices.

Hazmat Site Control Function. Establish control zones, establish and monitor access routes at the incident site, and ensure that contaminants are not being spread.

HAZWOPER. Acronym used for the OSHA Hazardous Wastes Operations and Emergency Response regulation (29 CFR 1910.120).

Heat Affected Zone. Area in the undisturbed tank metal next to the actual weld material. This area is less ductile than either the weld or the steel plate due to the effect of the heat of the welding process. This zone is most vulnerable to damage, as cracks are likely to start here.

Heat Cramps. A cramp in the extremities or abdomen caused by the depletion of water and salt in the body. Usually occurs after physical exertion in an extremely hot environment or under conditions that cause profuse sweating and depletion of body fluids and electrolytes.

Heat Exhaustion. A mild form of shock caused when the circulatory system begins to fail as a result of the body's inadequate effort to give off excessive heat.

Heat Rash. An inflammation of the skin resulting from prolonged exposure to heat and humid air and often aggravated by chafing clothing. Heat rash is uncomfortable and decreases the ability of the body to tolerate heat.

Heat Stroke. A severe and sometimes fatal condition resulting from the failure of the temperature regulating capacity of the body. It is caused by exposure to the sun or high temperatures. Reduction or cessation of sweating is an early symptom. Body temperature of 105°F or higher, rapid pulse, hot and dry skin, headache, confusion, unconsciousness, and convulsions may occur. Heat stroke is a true medical emergency requiring immediate transport to a medical facility.

Hematotoxins. A toxin of the blood system (e.g., benzene, chlordane, DDT).

Hepatotoxin. A toxin destructive of the liver (e.g., carbon tetrachloride, vinyl chlorise monomer).

High Temperature Protective Clothing. Protective clothing designed to protect the wearer against short-term high temperature exposures. Includes both proximity suits and fire entry suits. This type of clothing is usually of limited use in dealing with chemical exposures.

HMRT. (See Hazardous Materials Response Team.)

Hot Tapping. An offensive technique for welding on and cutting holes through liquid and/or compressed gas vessels and piping for the purposes of relieving the internal pressure and/or removing the product.

Hot Zone. An area immediately surrounding a hazardous materials incident, which extends far enough to prevent adverse effects from hazardous materials releases to personnel outside the zone. This zone is also referred to as the "exclusion zone," the "red zone," and the "restricted zone" in other documents.

Housing. Fixture on the top of a nonpressurized railroad tank car designed to provide protection for valves, pressure relief valve, and/or gauging devices.

Hydrocarbons. Compounds primarily made up of hydrogen and carbon. Examples include LPG, gasoline, and fuel oils.

Hygroscopic. A substance that has the property of absorbing moisture from the air, such as**.**

Hypergolic. Two chemical substances that spontaneously ignite upon mixing.

I

Ignition (Autoignition) Temperature. Minimum temperature required to ignite gas or vapor without a spark or flame being present. Significant in evaluating the ease at which a flammable material may ignite.

Immediately Dangerous to Life or Health (IDLH). An atmospheric concentration of any toxic, corrosive or asphyxiant substance that poses an immediate threat to life or would cause irreversible or delayed adverse health effects or would interfere with an individual's ability to escape from a dangerous atmosphere.

Impingement Event. As the hazmat and/or its container engulf an area, they will impinge or come in contact with exposures. They may also impinge upon other hazmat containers, producing additional problems.

Incident. A release or potential release of a hazardous material from its container into the environment.

Incident Action Plan. The strategic goals, tactical objectives, and support requirements for the incident. All incidents require an action plan. For simple incidents (Level I) the action plan is not usually in written form. Large or complex incidents (Level II or III) will require that the action plan be documented in writing.

Incident Commander (IC). The person responsible for the management of all incident operations. The IC is in charge of the incident site. May also be referred to as the On-Scene Incident Commander as defined in 29 CFR 1910.120.

Incident Management System (IMS). An organized system of roles, responsibilities, and standard operating procedures used to manage and direct emergency operations. May also be referred to as Incident Command System (ICS).

Inert Gas. A nonreactive gas, such as argon, helium, and neon.

Ingestion. The introduction of a chemical into the body through the mouth. Inhaled chemicals may be trapped in saliva and swallowed. Exposed personnel should be prohibited from smoking, eating, or drinking except in designated rest and rehab areas after being decontaminated.

Ingredient Statement. The statement on all agricultural chemical labels which breaks down the chemical ingredients by their relative percentages or as pounds per gallon of concentrate. "Active" ingredients are the active chemicals within the mixture. They must be listed by chemical name, and their common name may also be shown. "Inert" ingredients have no ag chem/pesticide activity and are usually not broken into specific components, only total percentage.

Inhalation. The introduction of a chemical or toxic products of combustion into the body by way of the respiratory system. Inhalation is the most common exposure route and often the most damaging. Toxins may be absorbed into the bloodstream and carried to other internal organs, or they may affect the upper and/or lower respiratory tract. Resulting respiratory injuries include pulmonary edema and respiratory congestion.

Inhibitor. Added to products to control their chemical reaction with other products. If the inhibitor is not added or escapes during an incident, the material will begin to polymerize, possibly resulting in container failure.

Inorganic Materials. Compounds derived from other than vegetable or animal sources which lack carbon chains but may contain a carbon atom (e.g., sulfur dioxide—SO^2).
Instability. (See Reactivity.)
Intrinsically Safe Construction. Equipment or wiring is incapable of releasing sufficient electrical energy under both normal and abnormal conditions to cause the ignition of a flammable mixture. Commonly used in portable direct-reading instruments for operations in Class I, Division 2 hazardous locations.
Intermodal Tank Containers. Specific class of portable tanks specifically designed for international intermodal use. Most common types are the IM 101, IM 102, and the DOT Spec. 51 portable tanks.
Ionizing Radiation. Characterized by the ability to create charged particles or ions in anything which it strikes. Exposure to low levels of ionizing radiation can produce short-term or long-term cellular changes with potentially harmful effects, such as cancer or leukemia.
Isolating the Scene. The process of preventing persons and equipment from becoming exposed to a actual or potential hazmat release. Includes establishing isolation perimeter and control zones.
Isolation Perimeter. The designated crowd control line surrounding the Hazard Control Zones. The isolation perimeter is always the line between the general public and the Cold Zone.

J

Jacket. Outer metal covering of a railroad tank car that protects the tank's insulation and keeps it in place.

L

Lab Pack. An overpack drum or disposal container which contains multiple, smaller chemical containers with compatible chemical characteristics. Absorbent materials are usually placed within the overpack container to minimize potential for breakage and/or leakage.
Leak. The uncontrolled release of a hazardous material which could pose a threat to health, safety, and/or the environment.
Leak Control Compounds. Substances used for the plugging and patching of leaks in nonpressure containers (e.g., putty, wooden plugs, etc.).
Leak Control Devices. Tools and equipment used for the plugging and patching of leaks in nonpressure and some low pressure containers, pipes, and tanks (e.g., patch kits, Chlorine kits, etc.).
LEPC. (See Local Emergency Planning Committee.)
Lethal Concentration, 50 Percent Kill (LC-50). Concentration of a material, expressed as parts per million (Ppm) per volume, which kills half of the lab animals in a given length of time. Refers to an inhalation exposure, the LC-50 may also be expressed as mg/liter or mg/cubic meter. Significant in evaluating the toxicity of a material; the lower the value, the more toxic the substance.

Lethal Concentration Low (LC_{Low}). The lowest concentration of a substance in air reported to have caused death in humans or animals. The reported concentrations may be entered for periods of exposure that are less than 24 hours (acute) or greater than 24 hours (subacute and chronic).

Lethal Dose, 50 Percent Kill (LD_{-50}). The amount of a dose which, when administered to lab animals, kills 50% of them. Refers to an oral or dermal exposure and is expressed in terms of mg/kg. Significant in evaluating the toxicity of a material; the lower the value, the more toxic the substance.

Lethal Dose Low (LDLow). The lowest amount of a substance introduced by any route, other than inhalation, reported to have caused death to animals or humans.

Level I Staging. Initial arriving emergency response units go directly to the incident scene taking standard positions (e.g., upwind, uphill as appropriate), assume command, and begin site management operations. The remaining units stage at a safe distance away from the scene until ordered into action by the Incident Commander.

Level II Staging. Used for large, complex, or lengthy hazmat operations. Additional units are staged together in a specific location under the command of a Staging Officer. May be referred to as “Base” within the Firescope System.

Liaison Officer. The point of contact for assisting or coordinating agencies. Member of the Command Staff.

Limited-Use Materials. Protective clothing materials which are used and then discarded. Although they may be reused several times (based upon chemical exposures), they are often disposed of after a single use. Examples include Tyvek™ QC, Tyvek™/Saranex™ 23-P, Barricade™, Kappler CPF™ III and CPF™ IV, Chemrel Max™, and the Lifeguard Responder™.

Liquid Chemical Splash Protective Clothing. The garment portion of a chemical protective clothing ensemble that is designed and configured to protect the wearer against chemical liquid splashes but not against chemical vapors or gases. Liquid splash chemical protective clothing must meet the requirements of NFPA 1992. This type of protective clothing is a component of EPA Level B chemical protection.

Local Emergency Planning Committee (LEPC). A committee appointed by a State Emergency Response Commission, as required by SARA Title II, to formulate a comprehensive emergency plan for its region.

Lower Detection Limit (LDL). The lowest concentration to which a monitoring instrument will respond. The lower the LDL, the quicker contaminant concentrations can be evaluated.

M

Manifest. A shipping document that lists the commodities being transported on a vessel.

Markings. The required names, instructions, cautions, specifications, or combinations thereof found on containers of hazardous materials and hazardous wastes.

Material Safety Data Sheet (MSDS). A document which contains information regarding the chemical composition, physical and chemical properties, health and safety hazards, emergency response, and waste disposal of the material as required by 29 CFR 1910.1200.

Mechanical Harm Events. Those harm events resulting from direct contact with fragments scattered because of a container failure, explosion, or shock wave.

Mechanical Stress. The result of a transfer of energy when one object physically contacts or collides with another. Indicators include punctures, gouges, breaks or tears in the container.

Medical Monitoring. An ongoing, systematic evaluation of individuals at risk of suffering adverse effects of exposure to heat, stress, or hazardous materials as a result of working at a hazmat emergency.

Medical Surveillance. Comprehensive medical program for tracking the overall health of its participants (e.g., HMRT personnel, public safety responders, etc.). Medical surveillance programs consist of pre-employment screening, periodic medical examinations, emergency treatment provisions, nonemergency treatment, and recordkeeping and review.

Melting Point. The temperature at which a solid changes its phase to a liquid. This temperature is also the freezing point depending on the direction of the change. For mixtures, a melting point range may be given. Significant property in evaluating the hazards of a material as well as the integrity of a container (e.g., frozen material may cause its container to fail).

Minimum Detectable Permeation Rate (MDPR). The minimum permeation rate that can be detected by the laboratory analytical system being used for the permeation test.

Miscible. Refers to the tendency or ability of two or more liquids to form a uniform blend or to dissolve in each other. Liquids may be totally miscible, partially miscible, or nonmiscible.

Mitigation. Any offensive or defensive action to contain, control, reduce, or eliminate the harmful effects of a hazardous materials release.

Mixture. Substance made up of two or more compounds, physically mixed together. A mixture may also contain elements and compounds mixed together.

Monitoring. The act of systematically checking to determine contaminant levels and atmospheric conditions.

Monitoring Instruments. Monitoring and detection instruments used to detect the presence and/or concentration of contaminants within an environment. They include:

> **Combustible Gas Indicator (CGI):** Measure the concentration of a combustible gas or vapor in air.
>
> **Oxygen Monitor:** Measures the percentage of oxygen in air.
>
> **Colorimetric Indicator Tubes:** Measures the concentration of specific gases and vapors in air.
>
> **Specific Chemical Monitors:** Designed to detect a large group of chemicals or a specific chemical. Most common examples include carbon monoxide and hydrogen sulfide.
>
> **Flame Ionization Detector (FID):** A device used to determine the presence of organic vapors and gases in air. Operates in two modes—survey mode and gas chromatograph.
>
> **Gas Chromatograph:** Instruments used for identifying and analyzing specific organics compounds.
>
> **Photoionization Detector (PID):** A device used to determine the total concentration of many organic and some inorganic gases and vapors in air.
>
> **Radiation Monitors:** Instruments used to measure accumulated radiation exposure. Include alpha, beta, and gamma survey detectors.
>
> Instruments which measure the amount of radiation to which a person has been exposed.
>
> **Corrosivity (pH) Detector:** A meter, paper, or strip that indicates the relative acidity or alkalinity of a substance, generally using an international scale of 0 (acid) through 14 (alkali-caustic). (See pH.)

Indicator Papers: Special chemical indicating papers which test for the presence of specific hazards, such as oxidizers, organic peroxides, and hydrogen sulfide. Are usually part of a hazmat identification system.

MSDS. (See Material Safety Data Sheet.)

Multi-Use Materials. Based upon the chemical exposure, multi-use materials are designed and fabricated to allow for decontamination and re-use. Generally thicker and more durable than limited-use garments, they are used for chemical splash and vapor protective suits, gloves, aprons, boots, and thermal protective clothing. The most common materials include butyl rubber, Viton, polyvinyl chloride (PVC), neoprene rubber, and Teflon™.

Mutagen. A material that creates a change in gene structure which is potentially capable of being transmitted to the offspring.

N

National Contingency Plan (NCP). Outlines the policies and procedures of the federal agency members of the National Oil and Hazardous Materials Response Team (also known as the National Response Team or the NRT). Provides guidance for emergency responses, remedial actions, enforcement, and funding for federal government response to hazmat incidents.

National Fire Protection Association (NFPA). An international voluntary membership organization to promote improved fire protection and prevention, establish safeguards against loss of life and property by fire, and writes and publish national voluntary consensus standards (e.g., NFPA 472, *Professional Competence of Responders to Hazardous Materials Incidents*).

National Institute for Occupational Safety and Health (NIOSH). A Federal agency which, among other activities, tests and certifies respiratory protective devices and air sampling detector tubes and recommends occupational exposure limits for various substances.

National Interagency Incident Management System (NIIMS). A standardized systems approach to incident management that consists of five major sub-divisions collectively providing a total systems approach to all-risk incident management.

National Response Center (NRC). Communications center operated by the U.S. Coast Guard in Washington, DC. It provides information on suggested technical emergency actions and is the federal spill notification point. The NRC must be notified within 24 hours of any spill of a reportable quantity of a hazardous substance by the spiller. Can be contacted at (800) 424-8802.

National Response Team (NRT). The National Oil and Hazardous Materials Response Team consists of fourteen federal government agencies which carry out the provisions of the National Contingency Plan at the federal level. The NRT is chaired by EPA, while the vice-chairperson represents the U.S. Coast Guard.

National Transportation Safety Board (NTSB). Independent federal agency charged with responsibility for investigating serious accidents and emergencies involving the various modes of transportation (e.g., highway, pipeline, air) as well as hazardous materials. Issues investigation reports and nonbinding recommendations for action.

Nephrotoxins. Toxins which attack the kidneys (e.g., mercury, halogenated hydrocarbons).

Neurotoxins. Toxins which attack the central nervous system (e.g., organ-ophosphate pesticides).

Neutralization. The process of neutralizing a hazmat liquid spill by applying another material to the spill which will react chemically with it to form a less harmful

substance. Those materials which can be used to neutralize the effects of a corrosive material (e.g., acids and bases).

Nonbulk Packaging. Any packaging having a capacity meeting one of the following criteria:

- Liquid—internal volume of 119 gallons (450 L) or less;
- Solid—capacity of 882 lbs. (400 kg) or less; and
- Compressed Gas—water capacity of 1,001 lbs. (454 kg) or less.

Nonintervention Tactics. Essentially "no action." It is useful at certain fire emergencies where the potential costs of action far exceed any benefits (e.g., BLEVE scenario).

Nonionizing Radiation. Waves of energy, such as radiant heat, radio waves, and visible light. The amount of energy in these waves is small as compared to ionizing radiation. Examples include infrared waves, microwaves, and lasers.

Normalized Breakthrough Time. A calculation, using actual permeation results, to determine the time at which the permeation rate reaches 0.1 µg/cm^2/min. Normalized breakthrough times are useful for comparing the performance of several different protective clothing materials. Note that in Europe, breakthrough times are normalized at 1.0 µg/cm^2/min, a full order of magnitude less sensitive.

Not Otherwise Specified (NOS). A shipping paper notation which indicates that the material meets the DOT definition for a hazardous material but is not listed by a generic name within the DOT Regulations. The technical name of the material must be entered in parenthesis with the basic description. For example, Flammable Liquid, n.o.s. (contains methanol).

O

Occupational Safety and Health Administration (OSHA). Component of the United States Department of Labor; an agency with safety and health regulatory and enforcement authorities for most United States industries, businesses and states.

Odor Threshold (TLV_{Odor}). The lowest concentration of a material's vapor in air that is detectable by odor. If the TLVodor is below the TLV/TWA, odor may provide a warning as to the presence of a material.

Offensive Tactics. Aggressive leak, spill, and fire control tactics designed to quickly control or mitigate the problem. Although increasing risks to emergency responders, offensive tactics may be justified if rescue operations can be quickly achieved, if the spill can be rapidly confined or contained, or if the fire can be quickly extinguished.

Off-Site Specialist Employee A. Those persons who are specially trained to handle incidents involving chemicals and/or containers for chemicals used in their organization's area of specialization. Consistent with the organization's response plan and standard operating procedures, the Off-Site Specialist Employee A shall have the ability to analyze an incident involving chemicals within the organization's area of specialization, plan a response to that incident, implement the planned response within the capabilities of the resources available, and evaluate the progress of the planned response.

Off-Site Specialist Employee B. Those persons who in the course of their regular job duties, work with or are trained in the hazards of specific chemicals and/or containers for chemicals used in their individual area of specialization. Because of their education, training or work experience, the Off-Site Specialist Employee B may be called upon to gather and record information, provide technical advice, and provide technical assistance (including work within the hot zone) at an incident involving chemicals consistent with their organization's emergency response plan and standard operating procedures and the local emergency response plan.

Off-Site Specialist Employee C. The Off-Site Specialist C should be able to provide information on a specific chemical or container and have the organizational contacts needed to acquire additional technical assistance. This individual need not have the skills or training necessary to conduct control operations. This individual is generally found at the command post providing the IC or his or her designee with technical assistance.

Oil Pollution Act (OPA). Amended the Federal Water Pollution Act, OPA's scope covers both facilities and carriers of oil and related liquid products, including deepwater marine terminals, marine vessels, pipelines, and rail cars. Requirements include the development of emergency response plans, training and exercises, and verification of spill resources and contractor capabilities.

On-Scene Coordinator (OSC). The federal official pre-designated by EPA or the USCG to coordinate and direct federal responses and removals under the National Contingency Plan.

On-Scene Incident Commander. (See Incident Commander.)

Operations Section. Responsible for all tactical operations at the incident. The Hazmat Branch falls within the Operations Section.

Organic Materials. Materials which contain two or more carbon atoms. Organic materials are derived from materials that are living or were once living, such as plants or decayed products. Most organic materials are flammable. Examples include methane (CH_4) and propane (C_3H_8).

Organic Peroxide. Strong oxidizers, often chemically unstable, containing the -o-o- chemical structure. May react explosively to temperature and pressure changes as well as contamination.

Other Regulated Materials D (ORM D). A material, such as a consumer commodity, which presents a limited hazard during transportation due to its form, quantity, or packaging.

Overgarments. Protective clothing ensembles which are worn over chemical vapor protective clothing to provide either additional flash protection or low temperature protection.

Overgloving. The wearing of a second glove over the work glove for additional chemical and/or abrasion protection during entry operations.

Overpack. (1) A packaging used to contain one or more packages for convenience of handling and/or protection of the packages; (2) a term used to describe the placement of damaged or leaking packages in an overpack or recovery drum; (3) the outer packaging for radioactive materials.

Overpacking. Use of a specially constructed drum to overpack damaged or leaking containers of hazardous materials for shipment. Overpack containers should be compatible with the hazards of the materials involved.

Oxidation Ability. The ability of a material to (1) either give up its oxygen molecule to stimulate the oxidation of organic materials (e.g., chlorate, permanganate and nitrate compounds), or (2) receive electrons being transferred from the substance undergoing oxidation (e.g., chlorine and fluorine). Result of either activity is the release of energy.

Oxidizer. A chemical, other than a blasting agent or an explosive, that initiates or promotes combustion in other materials. This action may either cause the material to ignite or release oxygen or other gases, which causes the ignition of other surrounding materials.

Oxygen-Deficient Atmosphere. An atmosphere which contains an oxygen content less than 19.5% by volume at sea level.

P

Packaging. Any container that holds a material (hazardous and nonhazardous). Packaging for hazardous materials includes nonbulk and bulk packaging.

Packing Group. Classification of hazardous materials based on the degree of danger represented by the material. There are three groups: Packing Group I indicates great danger, Packing Group II indicates medium danger, and Packing Group III indicates minor danger.

Patching (Plugging). The use of chemically compatible patches and plugs to reduce or temporarily stop the flow of materials from small holes, rips, tears or gashes in containers.

PCB Contaminated. Any equipment, including transformers, that contains 50 to 500 ppm of PCB's.

Penetration. The flow or movement of a hazardous chemical through closures, seams, porous materials, and pinholes or other imperfections in the material. While liquids are most common, solid materials (e.g., asbestos) can also penetrate through protective clothing materials.

Permeation. The process by which a hazardous chemical moves through a given material on the molecular level. Permeation differs from penetration in that permeation occurs through the clothing material itself rather than through the openings in the clothing material.

Permeation Rate. The rate at which a chemical passes through a given chemical protective clothing material. Expressed as micrograms per square centimeter per minute ($\mu gm/cm_2/min$). For reference purposes, 0.9 $\mu gm/cm^2/min$ is equal to approximately 1 drop/hour.

Permissible Exposure Limit (PEL). The maximum time-weighted concentration at which 95% of exposed, healthy adults suffer no adverse effects over a 40-hour work week and are comparable to ACGIH's TLV/TWA. PEL's are used by OSHA and are based on an eight-hour, time-weighted average concentration.

Personal Protective Equipment (PPE). Equipment provided to shield or isolate a person from the chemical, physical, and thermal hazards that may be encountered at a hazardous materials incident. Adequate personal protective equipment should protect the respiratory system, skin, eyes, face, hands, feet, head, body, and hearing. Personal protective equipment includes: personal protective clothing, self-contained positive pressure breathing apparatus, and air purifying respirators.

pH (Power of Hydrogen). Acidic or basic corrosives are measured to one another by their ability to dissociate in solution. Those that form the greatest number of hydrogen ions are the strongest acids, while those that form the hydroxide ion are the strongest bases. The measurement of the hydrogen ion concentration in solution is called the pH (power of hydrogen) of the compound in solution. The pH scale ranges from zero to 14, with strong acids having low pH values and strong bases or alkaline materials having high pH values. A neutral substance would have a value of 7.

Physical State. The physical state or form (solid, liquid, gas) of the material at normal ambient temperatures (68°F to 77°F).

Planning Section. Responsible for the collection, evaluation, dissemination and use of information about the development of the incident and the status of resources. Includes the Situation Status, Resource Status, Documentation, and Demobilization Units as well as Technical Specialists.

Plume. A vapor, liquid, dust, or gaseous cloud formation which has shape and buoyancy.

Pneumatic Hopper Trailer. Covered hopper trailers that are pneumatically unloaded and used for transporting solids. Have a capacity up to 1,500 cubic feet.

Polymerization. A reaction during which a monomer is induced to polymerize by the addition of a catalyst or other unintentional influences, such as excessive heat, friction, contamination, etc. If the reaction is not controlled, it is possible to have an excessive amount of energy released.

Portable Bin. Portable tanks used to transport bulk solids. Are approximately 4 feet square and 6 feet high, with weights up to 7,700 pounds. Normally loaded through the top and unloaded from the side or bottom.

Portable Tank. Any packaging (except a cylinder having 1,000 lbs. or less water capacity) over 110 gallons capacity and designed primarily to be loaded into, on, or temporarily attached to a transport vehicle or ship and equipped with skids, mountings, or accessories to facilitate handling of the tank by mechanical means.

Post-Emergency Response. That portion of an emergency response performed after the immediate threat of a release has been stabilized or eliminated and the clean-up of the site has begun.

Post-Incident Analysis. An element of incident termination that includes completing the required incident reporting forms, determining the level of financial responsibility, and assembling documentation for conducting a critique.

Process Safety Management (PSM). The application of management principles, methods and practices to prevent and control releases of hazardous chemicals or energy. Focus of both OSHA 1910.119, *Process Safety Management of Highly Hazardous Chemicals, Explosives and Blasting Agents* and EPA Part 68, *Risk Management Programs for Chemical Accidental Release Prevention.*

Product Name. Brand or trade name printed on the front panel of a hazmat container. If the product name includes the term "technical," as in Parathion Technical, it generally indicates a highly concentrated pesticide with 70% to 99% active ingredients.

Proper Shipping Name. The DOT designated name for a commodity or material. Will appear on shipping papers and on some containers. May also be referred to as shipping name.

Protection in-Place. Directing fixed facility personnel and the general public to go inside of a building or a structure and remain indoors until the danger from a hazardous materials release has passed. It may also be referred to as in-place protection, sheltering-in-place, sheltering, and taking refuge.

Protective Clothing. Equipment designed to protect the wearer from heat and/or hazardous materials contacting the skin or eyes. Protective clothing is divided into four types:

- Structural firefighting protective clothing
- Liquid splash chemical protective clothing
- Vapor chemical protective clothing
- High temperature protective clothing

Proximity Suits. Designed for exposures of short duration and close proximity to flame and radiant heat, such as in aircraft rescue firefighting (ARFF) operations. The outer shell is a highly reflective, aluminized fabric over an inner shell of a flame-retardant fabric such as Kevlar™ or Kevlar™/PBI™ blends. These ensembles are not designed to offer any substantial chemical protection.

Public Information Officer. The individual responsible for interface with the media or other appropriate agencies requiring information direct from the incident scene. Member of the Command Staff.

Public Protective Actions. The strategy used by the Incident Commander to protect unexposed people from the hazardous materials release by evacuating or protecting-in-place. This strategy is usually implemented after the IC has established an isolation perimeter and defined the Hazard Control Zones for emergency responders.

Purging. Totally enclosed electrical equipment is protected with an inert gas under a slight positive pressure from a reliable source. The inert gas provides positive pressure within the enclosure and minimizes the development of a flammable atmosphere. Used in Class I, Division 1 atmospheres at fixed installations.

Pyrophoric Materials. Materials that ignite spontaneously in air without an ignition source.

R

Radiation Harm Events. Those harm events related to the emission of radioactive energy. There are two types of radiation—ionizing and nonionizing.

Radioactivity. The ability of a material to emit any form of radioactive energy.

Rail Burn. Deformation in the shell of a railroad tank car. It is actually a long dent with a gouge at the bottom of the inward dent. A rail burn can be oriented circumferentially or longitudinally in relation to the tank shell. The longitudinal rail burns are the more serious because they have a tendency to cross a weld. A rail burn is generally caused by the tank car passing over a stationary object, such as a wheel flange or rail.

Reactivity/Instability. The ability of a material to undergo a chemical reaction with the release of energy. It could be initiated by mixing or reacting with other materials, application of heat, physical shock, etc.

Recommended Exposure Levels (REL). The maximum time-weighted concentration at which 95% of exposed, healthy adults suffer no adverse effects over a 40-hour work week and are comparable to ACGIH's TLV/TWA. REL's are used by NIOSH and are based upon a 10-hour, time-weighted average concentration.

Regional Response Team (RRT). Established within each federal region, the RRT follows the policy and program direction established by the NRT to ensure planning and coordination of both emergency preparedness and response activities. Members include EPA, USCG, state government, local government, and Indian tribal governments.

Rehabilitation (Rehab). Process of providing for EMS support, treatment, and monitoring, food and fluid replenishment, mental rest and relief from extreme environmental conditions associated with a hazmat incident. May function as either a sector or group within the Incident Management System.

Release Event. Once a container is breached, the hazmat is free to escape (be released) in the form of energy, matter, or a combination of both. Types of release include detonation, violent rupture, rapid relief, and spills or leaks.

Reportable Quantity (RQ). The designated amount of a hazardous substance that, if spilled or released, requires immediate notification to the National Response Center (NRC).

Reporting Marks and Number. The set of initials and a number stenciled on both sides and both ends of railroad cars. These markings can be used to obtain information on the contents of the car from either the railroad or the shipper.

Residue. The material remaining in a package after its contents have been emptied and before the packaging is refilled, cleaned, or purged of vapor to remove any potential hazard.

Resource Conservation and Recovery Act (RCRA). Law which establishes the regulatory framework for the proper management and disposal of all hazardous wastes, including treatment, storage, and disposal facilities. It also establishes installation, leak prevention, and notification requirements for underground storage tanks.

Respiratory Protection. Equipment designed to protect the wearer from the inhalation of contaminants. Respiratory protection includes positive-pressure self-contained breathing apparatus (SCBA), positive-pressure airline respirators (SAR's), and air purifying respirators.
Respiratory Toxins. Toxins which attack the respiratory system (e.g., asbestos, hydrogen sulfide).
Response. That portion of incident management in which personnel are involved in controlling (offensively or defensively) a hazmat incident. The activities in the response portion of a hazmat incident include analyzing the incident, planning the response, implementing the planned response, and evaluating progress.
Responsible Party (RP). A legally recognized entity (e.g., person, corporation, business or partnership, etc.) that has a legally recognized status of financial accountability and liability for actions necessary to abate and mitigate adverse environmental and human health and safety impacts resulting from a nonpermitted release or discharge of a hazardous material. The person or agency found legally accountable for the clean-up of an incident.
Retention. A defensive spill confinement method. Temporary containment of a hazmat in an area where it can be absorbed, neutralized, or picked up for proper disposal. Retention tactics are intended to be more permanent and may require resources such as portable basins, bladders, or other special material.
Risks. The probability of suffering a harm or loss. Risks are variable and change with every incident.
Risk Analysis. A process to analyze the probability that harm may occur to life, property, and the environment and to note the risks to be taken to identify the incident objectives.
Risk Management Programs. Required under EPA's proposed 40 CFR Part 68, risk management programs consist of three elements: (1) hazard assessment of the facility; (2) prevention program; and (3) emergency response considerations.
Roentgen. A measure of the charge produced in air created by ionizing radiation, usually in reference to gamma radiation.
Roentgen Equivalent Man (REM). The unit of dose equivalent; takes into account the effectiveness of different types of radiation.
Runaway Cracking. Cracking occurring in closed containers under pressure, such as liquid drums or pressure vessels. A small crack in a closed container suddenly develops into a rapidly growing crack which circles the container. As a result, the container will generally break into two or more pieces.

S

Safety Officer. Responsible for monitoring and assessing safety hazards and unsafe conditions and developing measures for ensuring personnel safety.
Member of the Command Staff. The Safety Officer is a required position at a hazmat incident based upon the requirements of OSHA 1910.120.
Sampling. The process of collecting a representative amount of a gas, liquid, or solid for evidence or analytical purposes.

Sampling Kit. Kits assembled for the purpose of providing adequate tools and equipment for taking samples and documenting unknowns to create a "chain of evidence."

Sanitary Sewer. A "closed" sewer system which carries wastewater from individual homes, together with minor quantities of stormwater, surface water, and groundwater that are not admitted intentionally. May also collect wastewater from industrial and commercial businesses. The collection and pumping system will transport the wastewater to a treatment plant, where the wastewater is processed.

SAR. (See Supplied Air Respirator.)

SARA. (See Superfund Amendments & Reauthorization Act.)

Saturated Hydrocarbons. A hydrocarbon possessing only single covalent bonds. All of the carbon atoms are saturated with hydrogen. Examples include methane (CH_4), propane (C_3H_8), and butane (C_4H_{10}).

SCBA. (See Self-Contained Breathing Apparatus.)

Scene. The location impacted or potentially impacted by a hazard.

Score. Reduction in the thickness of the container shell. It is an indentation in the shell made by a relatively blunt object. A score is characterized by the reduction of the container or weld material so that the metal is pushed aside along the track of contact with the blunt object.

Secondary Contamination. The process by which a contaminant is carried out of the hot zone and contaminates people, animals, the environment, or equipment outside of the hot zone.

Section. That organization level within the Incident Management System having functional responsibility for primary segments of incident operations, such as Operations, Planning, Logistics and Administration/Finance. The Section level is organizationally between Branch and the Incident Commander.

Sector. Either a geographic or functional assignment. Sector may take the place of either the Division or Group or both.

Self-Accelerating Decomposition Temperature (SADT). Property of organic peroxides. When this temperature is reached by some portion of the mass of the organic peroxide, irreversible decomposition will begin.

Self-Contained Breathing Apparatus (SCBA). A positive pressure, self-contained breathing apparatus (SCBA) or combination SCBA/supplied air breathing apparatus certified by the National Institute for Occupational Safety and Health (NIOSH) and the Mine Safety and Health Administration (MSHA) or the appropriate approval agency for use in atmospheres that are immediately dangerous to life or health (IDLH).

Sensitizer. A chemical that causes a substantial proportion of exposed people or animals to develop an allergic reaction in normal tissue after repeated exposure to the chemical. Skin sensitization is the most common form, while respiratory sensitization to a few chemicals is also known to occur.

SERC. (See State Emergency Response Commission.)

Shipper. A person, company, or agency offering material for transportation.

Shipping Documents/Papers. Generic term used to refer to documents that must accompany all shipments of goods for transportation. These include

Hazardous Waste Manifest, Bill of Lading, and Consists, etc. Shipping documents should provide the following:

- Proper shipping name.
- Hazard classification.
- Four-digit identification number(s), as required.
- Number of packages or containers.
- Type of packages.
- Total quantity by weight, volume, and/or packaging.

Shipping Name. The proper shipping name or other common name for the material; also any synonyms for the material.

Single Trip Container (STC). Container that may not be refilled or reshipped with a DOT-regulated material except under certain conditions.

Site Management and Control. The management and control of the physical site of a hazmat incident. Includes initially establishing command, approach, and positioning, staging, establishing initial perimeter and hazard control zones, and implementing public protective actions.

Size-Up. The rapid yet deliberate consideration of all critical scene factors.

Skilled Support Personnel. Personnel who are skilled in the operation of certain equipment, such as cranes and hoisting equipment, and who are needed temporarily to perform immediate emergency support work that cannot reasonably be performed in a timely fashion by emergency response personnel.

Skin Absorption. The introduction of a chemical or agent into the body through the skin. Skin absorption can occur with no sensation to the skin itself. Do not rely on pain or irritation as a warning sign of absorption. Skin absorption is enhanced by abrasions, cuts, heat, and moisture. The rate of skin absorption can vary depending upon the body part that's exposed.

Slurry. Pourable mixture of a solid and a liquid.

Sludge. Solid, semi-solid, or liquid waste generated from a municipal, commercial, or industrial waste treatment plant or air pollution control facility, exclusive of treated effluent from a wastewater treatment plant.

Solubility. The ability of a solid, liquid, gas, or vapor to dissolve in water or other specified medium. The ability of one material to blend uniformly with another, as in a solid in liquid, liquid in liquid, gas in liquid, or gas in gas. Significant property in evaluating the selection of control and extinguishing agents, including the use of water and firefighting foams.

Solution. Mixture in which all of the ingredients are completely dissolved. Solutions are composed of a solvent (water or another liquid) and a dissolved substance (known as the solute).

Specialist Employee. Employees who, in the course of their regular job duties, work with and are trained in the hazards of specific hazardous substances and who will be called upon to provide technical advice or assistance to the Incident Commander at a hazmat incident.

Specific Gravity. The weight of the material as compared with the weight of an equal volume of water. If the specific gravity is less than one, the material is lighter than water and will float. If the specific gravity is greater than one, the material is heavier than water and will sink. Most insoluble hydrocarbons are

lighter than water and will float on the surface. Significant property for determining spill control and clean-up procedures for water-borne releases.
Specification Marking. Found in various locations on railroad tank cars, intermodal portable tanks, and cargo tank trucks; it indicates the standards to which the container was built.
Spill. The release of a liquid, powder, or solid hazardous material in a manner that poses a threat to air, water, ground, and the environment.
Stabilization. The point in an incident at which the adverse behavior of the hazardous materials is controlled.
Staging. The management of committed and uncommitted emergency response resources (personnel and apparatus) to provide orderly deployment. See Level I Staging and Level II Staging.
Staging Area. The safe area established for temporary location of available resources closer to the incident site to reduce response time.
Standard of Care. The minimum accepted level of hazmat service to be provided as may be set forth by law, current regulations, consensus standards, local protocols and practice, and what has been accepted in the past (precedent).
Standard Transportation Commodity Code (STCC). A number which will be found on all shipping documents accompanying rail shipments of hazmats. A seven-digit number assigned to a specific material or group of materials and used in determination of rates. For a hazardous material, the STCC number will begin with the digits ‘’49.” Hazardous wastes may also be found with the first two digits being “48.” This code will also be found when intermodal containers are changed from rail to highway movement.
State Emergency Response Commission. Formed under SARA, Title III, the SERC is responsible for developing and maintaining the statewide hazmat emergency response plan. This includes ensuring that planning and training are taking place throughout the state as well as providing assistance to local governments and LEPC’s, as appropriate.
Statement of Practical Treatment. Located near the signal word on the front panel of an agricultural chemical or poison label, it is also referred to as the “First Aid Statement” or “Note to Physician.” It may have precautionary information as well as emergency procedures. Antidote and treatment information may also be added.
Storm Sewer. An “open” system which collects stormwater, surface water, and groundwater from throughout an area but excludes domestic wastewater and industrial wastes. A storm sewer may dump runoff directly into a retention area which is normally dry or into a stream, river, or waterway without treatment.
Strategic Goals. The overall plan that will be used to control an incident. Strategic goals are broad in nature and are achieved by the completion of tactical objectives.
Street Burn. Deformation in the shell of a highway cargo tank. It is actually a long dent that is inherently flat. A street burn is generally caused by a container overturning and sliding some distance along a cement or asphalt road.
Strength. The degree to which a corrosive ionizes in water. Those that form the greatest number of hydrogen ions are the strongest acids (e.g., pH < 2), while those that form the hydroxide ion are the strongest bases (pH > 12).

Stress Event. An applied force or system of forces that tend to either strain or deform a container (external action) or trigger a change in the condition of the contents (internal action). Types of stress include thermal, mechanical, and chemical.
Structural Firefighting Protective Clothing. Protective clothing normally worn by firefighters during structural fire fighting operations. It includes a helmet, coat, pants, boots, gloves, PASS device, and a hood to cover parts of the head not protected by the helmet. Structural firefighting clothing provides limited protection from heat but may not provide adequate protection from harmful liquids, gases, vapors, or dusts encountered during hazmat incidents. May also be referred to as turnout or bunker clothing.
Sublimation. The ability of a substance to change from the solid to the vapor phase without passing through the liquid phase. An increase in temperature can increase the rate of sublimation. Significant in evaluating the flammability or toxicity of any released materials which sublime. The opposite of sublimation is deposition (changes from vapor to solid).
Subsidiary Hazard Class. Indicates a hazard of a material other than the primary hazard assigned.
Superfund Amendments & Reauthorization Act (SARA). Created for the purpose of establishing federal statutes for right-to-know standards and emergency response to hazardous materials incidents. Re-authorized the federal Superfund program and mandated states to implement equivalent regulations/requirements.
Supplied Air Respirator (SAR). Positive pressure respirator which is supplied by either an airline hose or breathing air cylinders connected to the respirator by a short airline (or pigtail). When used in IDLH atmospheres, require a secondary source of air supply.
Synergistic Effect. The combined effect of two or more chemicals which is greater than the sum of the effect of each agent alone.
System Detection Limit (SDL). The minimum amount of chemical breakthrough that can be detected by the laboratory analytical system being used for the permeation test. Lower SDL's result in lower (or earlier) breakthrough times.
Systemic. Pertaining to the internal organs and structures of the human body.

T

Tactical Objectives. The specific operations that must be accomplished to achieve strategic goals. Tactical objectives must be both specific and measurable. Tactical level officers are Division/Group/Sector.
Technical Information Specialists. Individuals who provide specific expertise to the Incident Commander or the HMRT either in person, by telephone, or through other electronic means. They may represent the shipper, manufacturer or be otherwise familiar with the hazmats or problems involved.
Technical Name. Identifies the recognized chemical name currently used in scientific and technical handbooks, journals, and texts.
Teratogen. A material that affects the offspring when the embryo or fetus is exposed to that material.

Termination. That portion of incident management in which personnel are involved in documenting safety procedures, site operations, hazards faced, and lessons learned from the incident. Termination is divided into three phases: debriefing, post-incident analysis, and critique.

Thermal Harm Events. Those harm events related to exposure to temperature extremes.

Thermal Stress. Hazmat container stress generally indicated by temperature extremes, both hot and cold. Examples include fire, sparks, friction or electricity, and ambient temperature changes. Extreme or intense cold, such as that found with cryogenic materials, may also act as a stressor. clues of thermal stress include the operation of safety relief devices or the bulging of containers.

Threshold. The point at which a physiological or toxicological effect begins to be produced by the smallest degree of stimulation.

Threshold Limit Value/Ceiling (TLV/C). The maximum concentration that should not be exceeded, even instantaneously. The lower the value, the more toxic the substance.

Threshold Limit Value/Short-term Exposure Limit (TLV/STEL). The 15-minute, time-weighted average exposure which should not be exceeded at any time nor repeated more than four times daily with a 60-minute rest period required between each STEL exposure. The lower the value, the more toxic the substance.

Threshold Limit Value/Skin (Skin). Indicates a possible and significant contribution to overall exposure to a material by absorption through the skin, mucous membranes, and eyes by direct or airborne contact.

Threshold Limit Value/Time Weighted Average (TLV/TWA). The airborne concentration of a material to which an average, healthy person may be exposed repeatedly for 8 hours each day, 40 hours per week, without suffering adverse effects. The young, old, ill, and naturally susceptible will have lower tolerances and will need to take additional precautions. TLV's are based upon current available information and are adjusted on an annual basis by organizations such as the American Conference of Governmental Industrial Hygienists (ACGIH). As TLV's are time weighted averages over an 8-hour exposure, they are difficult to correlate to emergency response operations. The lower the value, the more toxic the substance.

Threshold Planning Quantity (TPQ). The quantity designated for each extremely hazardous substance (EHS) that triggers a required notification from a facility to the State Emergency Response Commission (SERC) and the Local Emergency Planning Committee (LEPC) that the facility is subject to reporting under SARA Title III.

TOFC. (See trailer-on-flat-car.)

Toxic Products of Combustion. The toxic byproducts of the combustion process. Depending upon the materials burning, higher levels of personal protective clothing and equipment may be required.

Toxicity. The ability of a substance to cause injury to a biologic tissue. Refers to the ability of a chemical to harm the body once contact has occurred.

Toxicity Harm Events. Those harm events related to exposure to toxins. Examples include neurotoxins, nephrotoxins, and hepatotoxins.

Toxicity Signal Words. The signal word found on product labels of poisons and agricultural chemicals which indicates the relative degree of acute toxicity. Located in the center of the front label panel, it is one of the most important label markings. The three toxicity signal words and categories are DANGER (high), WARNING (medium), and CAUTION (low).
Toxicology. The study of chemical or physical agents that produce adverse responses in the biologic systems with which they interact.
Trailer-on-Flat-Car (TOFC). Truck trailers which are shipped on a railroad flat cars.
Transfer. The process of physically moving a liquid, gas, or some forms of solids either manually, by pump, or by pressure transfer from a leaking or damaged container. The transfer pump, hoses, fittings, and container must be compatible with the hazardous materials involved. When transferring flammable liquids, proper bonding and grounding concerns must be addressed.
Transportation Index (TI). The number found on radioactive labels which indicates the maximum radiation level (measured in milli-roentgens/hour—mR/hr) at 1 meter from an undamaged package. For example, a TI of 3 would indicate that the radiation intensity that can be measured is no more than 3 mR/hr at 1 meter from the labeled package.

U

Unified Command. The process of determining overall incident strategies and tactical objectives by having all agencies, organizations, or individuals who have jurisdictional responsibility, and in some cases those who have functional responsibility at the incident, participate in the decision-making process.
UN/NA Identification Number. The four-digit identification number assigned to a hazardous material by the Department of Transportation; on shipping documents may be found with the prefix “UN” (United Nations) or “NA” (North American). The ID numbers are not unique, and more than one material may have the same ID number.
Unsaturated Hydrocarbons. A hydrocarbon with at least one multiple bond between two carbon atoms somewhere in the molecule. Generally, unsaturated hydrocarbons are more active chemically than saturated hydrocarbons, and are considered more hazardous. May also be referred to as the alkenes and alkynes. Examples include ethylene (C_2H_4), butadiene (C_4H_6), and acetylene (C_2H_2).

V

Vacuuming. Use of vacuums for picking up hazmat releases (e.g., mercury, asbestos). The method of vacuuming will depend upon the nature of the hazmat.
Vapor. An air dispersion of molecules in a substance that is normally a liquid or solid at standard temperature and pressure.
Vapor Density. The weight of a pure vapor or gas compared with the weight of an equal volume of dry air at the same temperature and pressure. The molecular weight of air is 29. If the vapor density of a gas is less than one, the material is lighter than air and may rise. If the vapor density is greater than one, the material

is heavier than air and will collect in low or enclosed areas. Significant property for evaluating exposures and where hazmat gas and vapor will travel.

Vapor Dispersion. Use of water spray to disperse or move vapors away from certain areas or materials. Note that reducing the concentration of a material through the use of a water spray may bring the material into its flammable range.

Vapor Pressure. The pressure exerted by the vapor within the container against the sides of a container. This pressure is temperature dependent; as the temperature increases, so does the vapor pressure. Consider the following three points:

1) The vapor pressure of a substance at 100°F is always higher than the vapor pressure at 68°F.
2) Vapor pressures reported in millimeters of mercury (mm Hg) are usually very low pressures. 760 mm Hg is equivalent to 14.7 psi or 1 atmosphere. Materials with vapor pressures greater than 760 mm Hg are usually found as gases.
3) The lower the boiling point of a liquid, the greater vapor pressure at a given temperature.

Vapor Suppression. Offensive control techniques used to mitigate the evolution of flammable, corrosive or toxic vapors and reduce the surface area exposed to the atmosphere. Includes the use of firefighting foams and hazmat vapor suppressants.

Vent and Burn. The use of shaped explosive charges to vent the high pressure at the the top of a pressurized container and then, with additional explosive charges, release and burn the remaining liquid in the container in a controlled fashion. This is a highly sophisticated technique that is only used under very controlled conditions.

Venting. The controlled release of a liquid or compressed gas to reduce the pressure and diminish the probability of an explosion. The method of venting will depend upon the nature of the hazmat.

Violent Rupture. Associated with chemical reactions having a release rate of less than one second (i.e., deflagration). There is no time to react in this scenario. This behavior is commonly associated with runaway cracking and overpressure of closed containers.

Viscosity. Measurement of the thickness of a liquid and its ability to flow. High viscosity liquids, such as heavy oils, must first be heated to increase their fluidity. Low viscosity liquids spread more easily and increase the size of the hazard area.

Volatility. The ease with which a liquid or solid can pass into the vapor state. The higher a material's volatility, the greater its rate of evaporation. Significant property in that volatile materials will readily disperse and increase the hazard area.

W

Warm Zone. The area where personnel and equipment decontamination and hot zone support takes place. It includes control points for the access corridor and thus assists in reducing the spread of contamination. This is also referred to as the “decontamination,” “contamination reduction,” “yellow zone,” “support zone,” or “limited access zone” in other documents.

Water Reactivity. Ability of a material to react with water and release a flammable gas or present a health hazard.

Waybill. A railroad shipping document describing the materials being transported. Indicates the shipped, consignee, routing, and weights. Used by the railroad for internal records and control, especially when the shipment is in transit.

Wheel Burn. Reduction in the thickness of a railroad tank shell. It is similar to a score but is caused by prolonged contact with a turning rail-car wheel.