

**Appendix F – Glossary**

**Acceptable Separation Distance (ASD)** – Under 24 CFR Part 51 Subpart C, the minimum distance from a hazardous operation to where a HUD-assisted project (including open spaces related to the HUD-assisted project where people congregate) can be located in accordance with HUD's standards of blast overpressure (0.5 psi-buildings, building occupants and outdoor unprotected facilities) and thermal radiation (450 BTU/ft<sup>2</sup>- hr – people and 10,000 BTU/ft<sup>2</sup> –hr – buildings). In addition, it is the minimum distance that HUD-assisted projects involving the installation of hazardous facilities can be located from existent or planned residences or from any other facility or area where people may congregate.

**Barrier** – A barrier designed to sustain blast overpressure (generated pressure from an explosion of a substance contained under pressure) from a substance stored under pressure undergoing a liquid-gas unbalanced reaction or thermal radiation (generated heat from the effects of combustion from a flammable substance) or both (blast overpressure and thermal radiation). The design, location and implementation of the barrier is not the same for all cases, the nature of the barrier varies depending on the results of the analysis of the proposed HUD-assisted project site.

**Blast-Overpressure** (also known as Peak Positive Incident Pressure or Psi) - Exerted pressure from a compressed liquid (or liquid-gas mixture) inside a container after an incident occurs, usually tank perforation due to corrosion or impact that prompts a liquid-gas unbalanced reaction and the container to explode with high energy.

**Bleve** – The type of explosion that occurs when a vessel containing a pressurized liquid is ruptured. A bleve can occur in a vessel that stores a substance that is usually a gas at atmospheric pressure but is a liquid when pressurized (for example, liquefied petroleum gas). The substance will be stored partly in liquid form with a gaseous vapor above the liquid filling the remainder of the container. If a vessel is ruptured (for example, due to corrosion or failure under pressure) the vapor portion may rapidly leak, dropping the pressure inside the container and releasing a wave of overpressure from the point of rupture. The sudden drop in pressure inside the container causes a liquid-gas unbalanced reaction which produces large amounts of vapor combined with large pressures in the process.

**Buried Container** (or underground storage container) - Any container or combination of containers that is used to hold a regulated substance or an accumulation of regulated substances and is located beneath the surface of the ground with no part of the container exposed to the air. Underground storage containers are not considered to be a hazard under 24 CFR Part 51 Subpart C, this *Guidebook*, or the ASD assessment tool for the calculation of the ASD from a hazard for a HUD-assisted project.

**Combustion** – A complex sequence of chemical reactions among oxygen, a fuel source and an ignition source resulting in the production of heat and light in the form of glow or flames.

**Container** – A structure (also known as a vessel, tank or enclosure) built to contain material in liquid, gas or solid state that can be designed for stationary or transport purposes. If this structure contains a product under pressure (this include gases and liquefied gases that are kept in their liquid state maintained at very low temperatures) it is called a vessel, for liquid or solid products, it is called a tank or an enclosure.

**Note:** Commercial containers used to hold liquids, solids or gases are all referred to as tanks. Technically speaking, however, containers that hold solids or liquids are properly referred to as tanks or enclosures and those for gases as vessels.

**Cryogenics** - The branches of physics and engineering that involve the study of very low temperatures, how to produce them, and how materials behave at those temperatures.

**Dike** – A continuous wall (built out of soil, asphalt, steel or concrete) surrounding a container, constructed as a defense or as a boundary to provide containment or impoundment during a spill. The dike completes the containment within the diked area and serves as the diked area perimeter. The combination of the diked area and the dike provide spill protection.

**Diked area** - The area between the container's outside wall and the dike. The dike area provides containment if there is a rupture and a spill.

**Fire Suppression Systems** – Systems designed to extinguish fires by automatically discharging fire suppressing media (e.g., water, high expansion foam, Halon gas) at the site of the fire. Fire suppressing systems work along with fire alert systems (fire alarms and sirens) to protect people and buildings from fire effects. Fire suppression systems detect fire by using special sensors called Ultraviolet Infrared (UVIR) sensors. UVIR sensors are localized at areas that require fire protection. Once the sensor(s) captures a change in temperature and wavelength on the ambient light from the area being protected, a signal is sent to discharge fire suppressing media at the area being protected from the fire.

**Fire Width** – Diameter of a fire ball.

**Flash Point** – The lowest temperature of a flammable liquid at which it can form an ignitable mixture with oxygen. At this temperature the vapor may cease to burn when the source of ignition is removed.

**Ground Flash** – Occurs as the mass of burning, expanding vapor is partially confined and channeled along the ground. It can cover an area hundreds of feet in diameter and cause massive burns to people in the ground flash area.

**Hazard** – Is a stationary operation or facility within a 1 mile surrounding distance from a HUD-assisted project site where chemicals of flammable or explosive nature are handled, stored or manufactured in above-ground containers.

**Hazardous Gas** – A flammable or combustible chemical or petroleum product which exists as a gas at normal atmospheric pressure and room temperature. Hazardous gases may be stored, processed or transported in a gaseous state in an unpressurized container or in a liquefied state in a pressurized or temperature controlled container. Its distinguished from the solid and the liquid states by relatively low density and viscosity, relatively great expansion and contraction with changes in pressure and temperature, the ability to diffuse readily, and the spontaneous tendency to become distributed uniformly throughout any container.

**Hazardous Liquid** - A flammable or combustible chemical or petroleum product which exists as a liquid at normal atmospheric pressure and room temperature. It is distinguished from the gaseous and solid states by its characteristic readiness to flow, little or no tendency to disperse, and relatively high incompressibility.

**Hazardous Products (or substances)** – Are those flammable and combustible gases or liquids which upon accidental release and ignition or explosion pose a threat to public safety or damage to property.

**HUD Assisted Projects** – Generally speaking, these are projects that are intended for residential, institutional, recreational, commercial or industrial use that are planned for development, construction, rehabilitation, modernization or conversion (change of one state of phase to another) with HUD subsidy, grant assistance, loan, loan guarantee, or mortgage insurance. The interpretation of the terms “rehabilitation” and “modernization” refer only to such repairs and renovation of the proposed HUD-assisted project that will result in an increased number of people being exposed to hazardous operations by increasing residential densities, converting a building for human habitation, or making a vacant building habitable.

**Heat of Combustion** – The energy released as heat when a compound undergoes complete combustion with oxygen. The chemical reaction is typically a hydrocarbon reacting with oxygen to form carbon dioxide, water and heat.

**Liquefied Natural Gas (LNG)** – A natural gas that has been processed to remove either valuable components (e.g. helium), or those impurities that could cause difficulty downstream (e.g. water or heavy hydrocarbons) and is then condensed into a liquid at almost atmospheric pressure (transport pressure around 25 kPa) by cooling it to approximately -163° Celcius. LNG is transported by specially designed cryogenic sea vessels and cryogenic road tankers and stored in specially designed tanks.

**Liquefied Petroleum Gas (LPG)** – A mixture of hydrocarbon gases (also called liquefied petroleum gas, liquid petroleum gas, LPG, LP Gas, or autogas) used as a fuel in heating appliances and vehicles, and increasingly replacing chlorofluorocarbons as an aerosol propellant and a refrigerant to reduce damage to the ozone layer. Varieties of LPG bought and sold include mixes that are primarily propane, mixes that are primarily butane, and mixes including both propane and butane, depending on the season (in winter more propane, in summer more butane).

**Loading facility** – A facility where hazardous products are loaded and unloaded from tanker trucks, railcars and sea vessels.

**Mitigation** – The process for implementing the required level of protection to a HUD-assisted project site from stationary hazardous operations which store, handle or process materials of explosive or flammable nature. This level of protection can be either a designed barrier or it can be a preexisting barrier, either natural (mountains, hills) or man-made (elevated buildings or housing developments).

**Open Spaces** – Regarding the regulation 24 CFR Part 51 Subpart C, these are areas where people perform outside activities (congregation, playing sports) outside of a building, such as a park, residential yard, canopy, residential parking space, etc

**Peak Positive Incident Pressure (Ps)** – Blast overpressure

**Pulse Oximeter** – A medical device used to monitor and evaluate a patient’s temperature and blood oxygen saturation levels. The oximeter measures the temperature of the tissue to which the sensor is attached, as well as the oxygen saturation of a person’s blood and changes in blood volumes in the skin, producing a graph representing such volume levels (photoplethysmograph).

**Process Vessel** – A tank, vat, kettle, autoclave reactor or other container used to mix, blend, heat or otherwise modify hazardous products.

**Scaled Distance** – A calculated distance requiring the input parameters of the standoff distance and the hazard's equivalent weight of TNT. This distance is plotted in a special graph for the determination of the peak positive incident pressure.

**Self-Contained Above Ground Containers (SCAC's)** - Containers with interstitial spill countermeasure systems for spill prevention control. SCAC's have two external walls. The first wall holds the product in the container; the second prevents the spill if the first wall ruptures. The interstitial space between the first and the second wall serves to prevent spillage.

**Standoff Distance** – For the calculation of the thermal heat flux and the peak positive incident pressure, the standoff distance means:

- For the thermal heat flux calculation – Standoff Distance is the calculated distance from the center of the fireball to the target. The target can be the perimeter of the proposed HUD-assisted project site or where the fire barrier can be implemented.
- For the peak positive incident pressure calculation – Standoff Distance is the measured distance from the center of the container (hazard) being assessed to the target. The target can be the perimeter of the proposed HUD-assisted project site or where the blast barrier can be implemented.

**Thermal Radiation** - Process by which energy is emitted by a warm or hot surface. The energy is electromagnetic radiation and so travels at the speed of light and does not require a medium to carry it. Thermal radiation ranges in frequency from infrared rays through visible light to ultraviolet rays. The intensity and frequency distribution of the emitted rays are determined by the nature and temperature of the emitting surface; in general, the hotter the object, the shorter the wavelength.

**TNT (Trinitrotoluene)** – Useful explosive material with convenient handling properties.

**Thermal Radiation Flux Levels** – Measured in BTU per square foot per hour, it is the unit used to express the heat emitted by a warm or hot surface.

**TNT Equivalent Weight**– The weight of TNT which would produce an explosion of equal magnitude as a unit mass of the hazardous substance under pressure

DRAFT