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GLOSSARY OF TERMS

(What are the Terms of Art For Incineration?)

ACID GASES - acidic components of gaseous emissions which are removed by wet or caustic scrubbing (e.g., SO2, HCl, HBr and HF). They may be recovered as products in a halogen acid furnace or neutralized with caustic.

AFTERBURNER CHAMBER - the secondary combustion stage of some incinerators in which wastes are combusted, usually as liquids and gases, pyrolyzed constituents and unburned organics from a first stage with supplemental fuels added, if needed. See pyrolysis, rotary kiln, SCC.

AIR MODELING - the mathematical description of the movement and dispersion of airborne constituents (often used in risk assessment modeling).

APCD (Air Pollution Control Device) - any device for treating gaseous emissions prior to discharge to the atmosphere by removing acidic gases, water vapor or particulates. Examples include baghouse, demister, ESP, IWS, quench, scrubber, venturi.

ASH - solid, noncombustible particulate residue usually comprised of a heavy, large-size fraction that settles by gravity (bottom ash), and a light, small-size fraction that is airborne (fly ash) and removed in APCDs. See APCD, particulate, slag.

AWFCO (Automatic Waste Feed Cutoff) - a system used to terminate hazardous waste feed when an emission limit is approached or exceeded.

BACT (Best Available Control Technology) - application of latest proven technology to achieve best treatment and control of gaseous emissions and aqueous discharges. cf. RACT.

BAGHOUSE - an assembly of porous media (fabric filter) which allows gaseous emissions to pass through while retaining solid particulates.

BIF (Boilers and Industrial Furnaces) - often used in two ways: 1) to define combustion units other than incinerators; or 2) to describe a set of EPA regulations promulgated in 1991 governing the emission limits for boilers and industrial furnaces. cf. boiler, industrial furnace, and incinerator

BOILER - an enclosed thermal device in which fuels or secondary materials are combusted and energy in the form of steam, heated fluids, or heated gases is recovered. cf. industrial furnace, incinerator.

BTF (Beyond-the-Floor) - a term used in the regulations from the Clean Air Act to indicate standards that are more stringent than MACT. cf. MACT.

BURNING - consumption of a combustible material, fuel, or waste, that results in the release of light, heat, and products of combustion. The intent of burning may be destructive (i.e., to destroy a waste) or constructive (i.e., to produce energy or a material product). See fire, flame.

CAPTIVE INCINERATOR - an incinerator owned and operated for private use by an individual waste generator.

CEM (Continuous Emission Monitor) - a device that continuously samples and analyzes stack gases. Currently used to monitor carbon monoxide (CO), hydrocarbons (HC), and Oxygen (O2) emissions from hazardous waste combustors.

CO (Carbon Monoxide) - a chemical compound that results when combustion is incomplete, often monitored to ensure that a combustion unit is working properly. See PIC, PCC.

CO2 (Carbon Dioxide) - one of the compounds that results from complete destruction of organic compounds.

CAA (Clean Air Act) - a Federal law that addresses control of airborne pollutants, administered by the U.S. EPA.

CWA (Clean Water Act) - a Federal law that addresses control of waterborne pollutants, administered by the U.S. EPA.

COMBUSTION - a chemical process in which organic (and some inorganic) compounds react with oxygen at elevated temperatures.

COMBUSTION AIR - that amount of air containing oxygen needed to support combustion of a given fuel or waste, usually supplied in excess.

CE (Combustion Efficiency) - a measure of the relative conversion of carbon in a fuel to carbon dioxide (CO2) and carbon monoxide (CO). Expressed in %, CE = 100 x CO2 (CO2 + CO). CE is not a measure of destruction of a fuel constituent. cf. DRE, fuel.

COMBUSTION UNIT - a boiler, industrial furnace, or incinerator.

COMMERCIAL INCINERATOR - an incinerator owned and operated by a waste management firm in which wastes may be burned for a fee.

CONSTITUENT - a component of a mixture. See fuel, POHC, recipe, waste.

CRITERIA POLLUTANTS - under the Clean Air Act, a series of pollutants subject to specific criteria, and which include NOx, SO2, lead and CO.

CRWI (Coalition for Responsible Waste Incineration) - a coalition of captive incinerators, commercial incinerators, incineration service industries, and academic institutions, dedicated to the advancement of high-temperature incineration for the destruction of wastes.

DEMISTER - an air pollution control device to remove dispersed water droplets (mist) from gaseous emissions. See particulate, venturi.

DIOXINS & FURANS - two groups of chlorinated organic compounds of potential health concern that may be formed at very low levels during combustion. See PCDD, PCDF.

DISCHARGE - the water released from some APCDs after processing in a wastewater treatment facility. cf. emission.

DISPERSION - the dilution of the gaseous emissions into the atmosphere downwind of the stack.

DISPOSAL - the final disposition of wastes (e.g., landfilling) after recovery and treatment in management hierarchy.

DUMP STACK - See emergency safety vent.

DRE (Destruction and Removal Efficiency) - a measure of thermal conversion of a POHC during a trial bum. DRE = 100 x (POHCin-POHCout)/POHCin, expressed in percent or in numbers of "nines," e.g., 99.99% = "4-nines." See POHC. Not to be confused with combustion efficiency. cf. CE.

ESP (Electrostatic Precipitator) - an air pollution control device for removing very fine solids from gaseous emissions by attracting them to electrically charged surfaces. The units may be wet or dry. See IWS.

EMERGENCY SAFETY VENT (ESV) - a quick opening, counter-balanced safety device to allow release of rapidly expanding gases (explosion) and pressure relief thereby preventing harm to employees or serious equipment damage. cf. dump stack.

EMISSION - the gaseous output from a combustion unit after treatment by air pollution control devices. cf. discharge.

EPA (U.S. Environmental Protection Agency) - the Federal agency responsible for promulgating environmental regulations as dictated by Congress under CAA, CWA, RCRA, SARA and TSCA.

FABRIC FILTER - see baghouse.

FACILITY - (1) a collection of integrated devices designed to accomplish a single specific purpose, e.g., an incinerator for the destruction of wastes with its associated waste storage and wastewater treatment, or a production plant for the manufacture of a specific chemical; (2) a series of interconnecting processes designed to complement each other, e.g., hazardous waste management integrating incineration, wastewater treatment, and landfill; (3) a group of different process plants at a single physical location or site.

FINAL PRODUCT - the ending material from a chemical process that is formed from the conversion of raw material(s) and sometimes process intermediate(s) and secondary material(s).

FIRE - the phenomenon of combustion manifested in light, flame and heat. It may involve: (1) constructive burning of a raw material for purposes of synthesizing a final product; (2) constructive burning of a fuel for purposes of releasing usable energy; or (3) destructive burning of a waste for purposes of destroying specific constituent(s).

FLAME - a body of gas or vapor that gives off energy, usually in the form of light and heat, as a result of rapid chemical reaction between a combustible material and air, oxygen, or other oxidizing agent. It may be luminous, yellow, and smoky if it contains suspended and incandescent particles (as of carbon soot in the case of a candle), or essentially colorless (natural gas or alcohol flames).

FUEL - a substance used to produce heat or power upon combustion in an incinerator, boiler, or other type of energy recovery device. It may be naturally derived (e.g., natural gas, fuel oil, coal) or waste-derived (e.g., refuse, discarded materials, process residuals, etc). See CE.

FUEL NOx - NOx formed by the reaction of nitrogen in nitrogenous fuels. cf. thermal NOx.

FUGITIVE - in reference to emissions to the environment that are not specifically directed through pipes, ducts or stacks.

GEP (Good Engineering Practice) - (1) a generally acceptable procedure based upon engineering experience and judgment: (2) in a narrow sense, calculation of stack heights in respect to neighboring buildings.

HAF (Halogen Acid Furnace) - an industrial furnace specific to the production of halogen acids (e.g., HCl) from halogenated secondary materials.

HAZARD - the combination of an effect and an exposure that may constitute a threat of harm to human health or the environment. See risk.

HAZARDOUS AIR POLLUTANTS (HAP) - under the Clean Air Act, a series of listed items which may constitute pollution if emitted above regulatorily specified levels. See NAAQS.

HAZARDOUS WASTE - a subcategory of solid waste (defined under RCRA to include solids, liquids, contained gases and sludges) that are regulatorily defined to be hazardous because: (1) they meet characteristics of corrosiveness, reactivity, flammability, or contain extractable constituents that are defined as toxic; or (2) they are listed solid wastes from specific or nonspecific sources that may contain potentially hazardous constituents. See mixture, residue.

HAZARDOUS WASTE MANAGEMENT - the overall system comprising generation, transport, storage, treatment, and disposal of hazardous wastes. See RCRA.

HWC MACT (Hazardous Waste Combustor MACT) - the EPA regulations that govern the emission limits for hazardous waste incinerators (both captive and commercial incinerators), cement kilns that burn hazardous waste, and lightweight aggregate kilns that burn hazardous waste.

HWI (Hazardous Waste Incinerator) - a unit operated for the express purpose of burning hazardous wastes. cf. MWC, MWI.

HEAT BALANCE - calculations made to determine the amount of heat generated upon the combustion of fuels and wastes and the amount of cooling water needed to cool and quench the reaction upon completion. cf. mass balance.

INCINERATE - to cause to burn to ashes; to consume by fire; to become completely burned; to destroy a waste by combustion. cf. burning.

INCINERATOR - an enclosed thermal device in which solid and hazardous wastes are combusted to reduce volume and hazard. See MWC, commercial incinerator, HWI, captive incinerator, MWI.

INCINERATION - the process of converting combustible constituents of wastes into products of complete combustion and trace products of incomplete combustion subject to air pollution control.

INDUCED DRAFT FAN - a device designed to pull combustion air and combustion products through an incinerator and associated air pollution control devices. The facility is operated under a negative pressure (less than atmospheric) to reduce intermittent and fugitive releases.

INDUSTRIAL FURNACE - an enclosed thermal device in which process intermediates are combusted and materials are recovered. Industrial furnaces may include cement, lime, aggregate and phosphate kilns; coke ovens; blast furnaces; and halogen acid furnaces. cf. boiler, incinerator.

INTERMITTENT - used in reference to: (1) nonconstant feeding of fuels or wastes to an incinerator which may be acceptable and permitted operation of a rotary kiln designed for unsteady-state operation; or (2) gaseous emissions which may include transient puffs of products of incomplete combustion during normal operation. See PIC.

IWS (Ionizing Wet Scrubber) - an air pollution control device for removing very fine solids from gaseous emissions by attracting them to electrically charged surfaces that are flushed with water. See ESP.

LDR (Land Disposal Restrictions) - a series of EPA regulations that require wastes be treated to certain standards prior to disposal on the land.

LVM (Low-volatile Metals) - a term in the HWC MACT rule referring to a group of metals that include arsenic, beryllium, and chromium.

LWAK (Lightweight Aggregate Kiln) - a rotary kiln that produces light weight aggregate for use in the building industry (i.e., concrete blocks).

MACT (Maximum Achievable Control Technology) - defined in the Clean Air Act as the average of the best performing 12% of existing sources.

MASS BALANCE - calculations made to determine the amount of oxygen (combustion air) needed to ensure optimal combustion of fuels and wastes, or to determine the amounts of any other chemical reactants or final products. cf. heat balance.

MATERIAL - an undiscarded substance of some determined value that may be thermally converted to make a useful product in an industrial furnace or other type of high-temperature chemical processing unit. It may be of either natural or synthetic origin (e.g., raw material, process intermediate or secondary material). cf. waste.

MIXTURE - a solid waste and a hazardous waste that may be assumed to become hazardous upon combination. cf. residue.

MTEC (Maximum Theoretical Emissions Concentration) - calculated by dividing the feedrate by the stack gas flowrate and is expressed as micrograms per dry standard cubic meter (ug/dscm).

MWC (Municipal Waste Combustor) - an incinerator operated for the express purpose of burning municipal wastes and usually dedicated to public use and supported by tax funds and/or user fees. cf. MWI, HWI.

MWI (Medical Waste Incinerator) - an incinerator operated for the express purpose of burning hospital and medical wastes. cf. HWI, MWC.

NAAQS (National Ambient Air Quality Standard) - under the Clean Air Act, a series of standards for hazardous air pollutants applicable to all gaseous emissions at the national level. See CAA.

NOx (Nitrogen Oxides) - a chemical grouping of nitrogen oxide (NO) and nitrogen dioxide (NO2). See fuel NOx, thermal NOx.

NON-CRITERIA POLLUTANTS - any identified potential pollutant exclusive of criteria pollutants which may include: (1) non-carcinogenic pollutants (HCl, Cl2); (2) suspect carcinogenic elements (As, Be, Cd, Cr+6 and Ni); and (3) organic toxicants (PCDDs, PCDFs and PCBs).

OPACITY - a visual or optical measure of the obstruction of light by solid particulates and liquid droplets suspended in air.

OPEN BURNING - burning of combustibles without confinement of fuels, flames, or emissions. cf. boiler, furnace, incinerator.

PARTICULATE MATTER (PM) - finely divided solid or liquid "particles" that may be airborne. Solids may be inorganics (oxides or salts), metals, or soot produced during combustion or entrained by passing air through solids. Liquids may be droplets other than uncombined water. See TSP.

PM-10 (Particulate Matter, 10 micron) - a measure of total suspended particulate that is less than 10 microns in diameter. See TSP.

PCBs (Polychlorinated Biphenyls) - a class of chemicals usually with four or more chlorine atoms per molecule and regulated under TSCA.

PCDD (Polychlorinated Dibenzo-p-Dioxin) - a class of chlorinated organic chemicals found at very low levels in combustion sources.

PCDF (Polychlorinated Dibenzo Furan) - a class of chlorinated organic chemicals found at very low levels in combustion sources.

PCC (Product of Complete Combustion) - any terminal product of chemical oxidation of a combustible constituent that is formed in a combustion unit (e.g., carbon dioxide, water, HCl). cf. PIC.

PIC (Product of Incomplete Combustion) - any combustible constituent formed during combustion that has not been converted to a product of complete combustion in a combustion unit (e.g., soot, CO, THC). cf. PCC.

POHC (Principal Organic Hazardous Constituent) - any combustible constituent(s) that is selected for monitoring during trial burn compliance tests. The compound(s) is typically defined to be a major constituent(s) of a hazardous waste and perceived to be relatively difficult to incinerate. See DRE.

PROCESS - (1) in chemical production, the conversion of raw materials and process intermediates into secondary materials and final products; (2) in waste treatment, the reduction of volume and/or hazard of wastes exclusive of disposal.

PROCESS INTERMEDIATE - a material resulting from the partial conversion of raw material(s) to final product(s) usually generated on a temporary basis.

PSD (Prevention of Significant Deterioration) - in reference to the Clean Air Act, applied to criteria pollutants.

PYROLYSIS - the formation of products of incomplete combustion in a thermal device under oxygen deficient conditions. See PIC.

QUENCH - an air pollution control device for: (1) cooling of gaseous combustion products by heat transfer with water, air or other fluid; or (2) contact of hot ash with water to reduce temperature. See scrubber.

RAW MATERIAL - the starting material(s) in a chemical process that is converted into final product(s) and sometimes process intermediate(s).

RACT (Reasonably Achievable Control Technology) - a less stringent control technology required for certain sources under the Clean Air Act. cf. BACT.

RCRA (Resource Conservation and Recovery Act) - a Federal law (1976) addressing existing and new solid and hazardous waste management and resource recovery facilities, administered by the U.S. EPA with individual state primacy. cf. SARA.

RECIPE - (1) a set of instructions for making something from various ingredients; (2) in a narrow sense, a hypothetical mixture of wastes having the highest relative abundance

of specific constituents of greatest concern, such as suspect carcinogens, which if burned simultaneously may constitute a worst-case situation.

RECOVERY - the processing of fuels or materials to save energy or material values before treatment and disposal in management hierarchy.

REFRACTORY - in incineration, a class of materials of construction designed to resist extreme operating conditions (e.g., brick for high-temperature resistance, etc).

RELEASE - (1) any accidental or unintentional spill, leak, emission or discharge of a material or untreated waste; (2) any permitted emission to air, discharge to water, or placement on land of treated waste residuals. See fugitive, intermittent, stack. SARA.

RESIDENCE TIME - the duration at which the waste contents of an incinerator are maintained at optimal temperature to ensure maximum destruction of POHCs and minimal formation of PICs.

RESIDUE - (1) remnants of a hazardous waste left after treatment which is assumed under some circumstances to still be hazardous unless proven otherwise; (2) a process intermediate that may be subject to energy or material recovery before waste treatment. See ash, slag. cf. mixture.

RISK - a possibility of loss, injury, or hazard. In reference to chemical exposure, risk can be expressed as: (1) a maximum cumulative risk by summing risks for all individual chemicals from a single source; (2) a maximum combined risk for a single chemical from multiple sources; or (3) combinations of multiple chemicals/multiple sources. cf. hazard.

RISK ASSESSMENT - quantification of effect and exposure defining the upper bond of risk. Actual risk may be less than estimated risk due to uncertainties and conservative assumptions. cf. risk management.

RISK MANAGEMENT - selection of technology or policy controlling risk. cf. risk assessment.

ROTARY KILN - a first stage of some incinerators designed to rotate and burn a wide variety of feeds and varying feed rates of solid and hazardous wastes, and supplemental fuels as needed. See afterburner chamber, SCC.

SARA (Superfund Amendments Reauthorization Act) - a Federal law addressing remedial action at hazardous waste management sites, data collection for toxic chemical effects and exposures, and reporting of releases of listed chemicals, administered by the U.S. EPA with individual state primacy. cf. RCRA.

SCC (Secondary Combustion Chamber) - See afterburner chamber.

SCRUBBER - an air pollution control device for removal of water-soluble vapors and gases, and airborne particulates from gaseous emissions by direct contact with a water or caustic spray or with a dry solid such as lime. See APCD, IWS, quench.

SECONDARY MATERIAL - a material that is not a primary product of a chemical process that is generated during the conversion of raw material(s) and sometimes process intermediate(s). See residue.

SLAG - solid noncombustible residue that has melted and fused into glassy aggregates at high temperature during combustion. See ash.

SLUDGE- (1) a solid residue separated from wastewater during treatment; (2) a solid chemical process residue which may be further processed for material recovery or discarded as a waste for treatment.

SOLID WASTE - (1) usually interpreted to encompass all waste that is not liquid or gaseous, (2) in a narrow sense, non-hazardous waste such as municipal refuse.

SOOT - particulate elemental carbon formed as a product of incomplete combustion. See PIC.

STACK - the point of continuous release from combustion devices of gaseous emissions that have been treated in air pollution control devices. cf. APCD, fugitive, intermittent, release.

SOx (Sulfur Oxides) - a chemical grouping of sulfur dioxide (SO2) and sulfur trioxide (SO3).

SVM (Semi-volatile Metal) - a term in the HWC MACT rule referring to a group of metals that include lead and cadmium.

TEST BURN - an informal evaluation of some aspect of incinerator operation involving sampling and analysis within permit limits.

TEQ (Toxic Equivalent Quotient) - an international method of relating the toxicity of dioxins and furans to the toxicity of 2,3,7,8-tetrachlorodibenzo-p-dioxin.

THERMAL NOx - NOx formed at high temperature by the reaction of nitrogen present in combustion air. cf. fuel NOx.

TLV (Threshold Limit Value) - an occupational exposure level as compiled by the American Conference of Governmental and Industrial Hygienists (ACGIH).

THC (Total HydroCarbons) - a composite of volatile organic compounds including methane that can arise from the incomplete combustion of both fuels and wastes. See PIC. cf. VOC.

TSCA (Toxic Substances Control Act) - a Federal law that addresses the reporting and control of toxic substances, administered by the U.S. EPA.

TSP (Total Suspended Particulate) - a measure of the total liquid and solid particulate matter suspended in a gaseous emission. See PM-10.

TREATMENT - the processing of wastes to reduce volume and/or hazard, after recovery, but before disposal in management hierarchy.

TRIAL BURN - a short-term, full-scale evaluation following a formal protocol for incinerating wastes selected as difficult to destroy under marginal operating conditions to determine acceptable ranges of operation while monitoring fuel and waste feeds and treated emissions to demonstrate performance according to prescribed standards.

TURBULENCE - a measure of the degree of mixing of fuels, wastes, and oxygen to ensure optimal operation.

TWA (Time-Weighted Average) - a mathematical procedure for prorating chemical exposure from concentration and time data.

UNIT RISK - biostatistically determined value representing the increased probability of carcinogenicity above a background level of risk that is associated with a specific lifetime exposure to a chemical of known potency, assuming no threshold exposure limit.

VENTURI - an air pollution control device designed to remove particulates from gaseous emissions through a pressure differential process. See APCD.

VOC (Volatile Organic Compound) - organic compounds (usually with boiling points less than 100-120°C) that are vaporized during incineration and which, if converted to PICs, may become adsorbed upon particulates during air pollution control. See PIC. cf. THC.

WASTE - a discarded material, usually with no determined value, that may be subjected to thermal treatment to accomplish volume and/or hazard reduction (destruction and removal) in an incinerator. It may be either of natural or synthetic origin. See constituent, material, residue, secondary material.

WASTE DISPOSAL - options exercised to properly place a treated waste into the environment (e.g., dispersal into air or water, or containment in landfill). See release. cf. waste treatment.

WASTE MANAGEMENT - the overall system for assessment, minimization, transport, storage, treatment, and disposal of waste. See facility.

WASTE REDUCTION - options exercised to reduce waste before its generation (e.g. raw material substitution, process modification, source separation, recycling, etc). See material, waste.

WASTE TREATMENT - options exercised to reduce the volume and/or hazard of a waste (wastewater treatment, incineration) after its generation and before waste disposal. cf. waste disposal.

WASTEWATER - waste constituents dissolved or suspended at dilute concentrations in an aqueous stream.