**Section 728.TABLE C Technology Codes and Description of Technology-Based Standards**

Technology

Code Description of Technology-Based Standard

ADGAS Venting of compressed gases into an absorbing or reacting media (i.e., solid or liquid) − venting can be accomplished through physical release utilizing valves or piping; physical penetration of the container; or penetration through detonation.

AMLGM Amalgamation of liquid, elemental mercury contaminated with radioactive materials utilizing inorganic reagents such as copper, zinc, nickel, gold, and sulfur that result in a nonliquid, semi-solid amalgam and thereby reducing potential emissions of elemental mercury vapors to the air.

BIODG Biodegradation of organics or non-metallic inorganics (i.e., degradable inorganics that contain the elements of phosphorus, nitrogen, and sulfur) in units operated under either aerobic or anaerobic conditions such that a surrogate compound or indicator parameter has been substan­tially reduced in concentration in the residuals (e.g., total organic carbon (TOC) can often be used as an indicator parameter for the biodegradation of many organic constituents that cannot be directly analyzed in wastewater residues).

CARBN Carbon adsorption (granulated or powdered) of non-metallic inorganics, organo-metallics, or organic constituents, operated so that a surrogate compound or indicator parameter has not undergone breakthrough (e.g., total organic carbon (TOC) can often be used as an indicator parameter for the adsorption of many organic constituents that cannot be directly analyzed in wastewater residues). Breakthrough occurs when the carbon has become saturated with the constituent (or indicator parameter) and substantial change in adsorption rate associated with that constituent occurs.

CHOXD Chemical or electrolytic oxidation utilizing the following oxidation reagents (or waste reagents) or combinations or reagents:

1) hypochlorite (e.g., bleach);

2) chlorine;

3) chlorine dioxide;

4) ozone or UV (ultraviolet light) assisted ozone;

5) peroxides;

6) persulfates;

7) perchlorates;

8) permanganates; or

9) other oxidizing reagents of equivalent efficiency, performed in units operated so that a surrogate compound or indicator parameter has been substantially reduced in concentration in the residuals (e.g., total organic carbon (TOC) can often be used as an indicator parameter for the oxidation of many organic constituents that cannot be directly analyzed in wastewater residues). Chemical oxidation specifically includes what is commonly referred to as alkaline chlorination.

CHRED Chemical reduction utilizing the following reducing reagents (or waste reagents) or combinations of reagents:

1) sulfur dioxide;

2) sodium, potassium, or alkali salts of sulfites, bisulfites, metabisulfites, and polyethylene glycols (e.g., NaPEG and KPEG);

3) sodium hydrosulfide;

4) ferrous salts; or

5) other reducing reagents of equivalent efficiency, performed in units operated such that a surrogate compound or indicator parameter has been substantially reduced in concentration in the residuals (e.g., total organic halogens (TOX) can often be used as an indicator parameter for the reduction of many halogenated organic constituents that cannot be directly analyzed in wastewater residues). Chemical reduction is commonly used for the reduction of hexavalent chromium to the trivalent state.

CMBST High temperature organic destruction technologies, such as combustion in incinerators, boilers, or industrial furnaces operated in accordance with the applicable requirements of Subpart O of 35 Ill. Adm. Code 724, Subpart O of 35 Ill. Adm. Code 725, or Subpart H of 35 Ill. Adm. Code 726, and in other units operated in accordance with applicable technical operating requirements; and certain non-combustive technologies, such as the Catalytic Extraction Process.

DEACT Deactivation to remove the hazardous characteristics of a waste due to its ignitability, corrosivity, or reactivity.

FSUBS Fuel substitution in units operated in accordance with applicable technical operating requirements.

HLVIT Vitrification of high-level mixed radioactive wastes in units in compliance with all applicable radioactive protection requirements under control of the federal Nuclear Regulatory Commission.

IMERC Incineration of wastes containing organics and mercury in units operated in accordance with the technical operating requirements of Subpart O of 35 Ill. Adm. Code 724 or Subpart O of 35 Ill. Adm. Code 725. All wastewater and nonwastewater residues derived from this process must then comply with the corresponding treatment standards per USEPA hazardous waste number with consideration of any applicable subcategories (e.g., high or low mercury sub­categories).

INCIN Incineration in units operated in accordance with the technical operating requirements of Subpart O of 35 Ill. Adm. Code 724 or Subpart O of 35 Ill. Adm. Code 725.

LLEXT Liquid-liquid extraction (often referred to as solvent extraction) of organics from liquid wastes into an immiscible solvent for which the hazardous constituents have a greater solvent affinity, resulting in an extract high in organics that must undergo either incineration, reuse as a fuel, or other recovery or reuse and a raffinate (extracted liquid waste) proportionately low in organics that must undergo further treatment as specified in the standard.

MACRO Macroencapsulation with surface coating materials such as polymeric organics (e.g., resins and plastics) or with a jacket of inert inorganic materials to substantially reduce surface exposure to potential leaching media. Macroencapsulation specifically does not include any material that would be classified as a tank or container according to 35 Ill. Adm. Code 720.110.

NEUTR Neutralization with the following reagents (or waste reagents) or combinations of reagents:

1) acids;

2) bases; or

3) water (including wastewaters) resulting in a pH greater than two but less than 12.5 as measured in the aqueous residuals.

NLDBR No land disposal based on recycling.

POLYM Formation of complex high-molecular weight solids through polymerization of monomers in high-TOC D001 nonwastewaters that are chemical components in the manufacture of plastics.

PRECP Chemical precipitation of metals and other inorganics as insoluble precipitates of oxides, hydroxides, carbonates, sulfides, sulfates, chlorides, fluorides, or phosphates. The following reagents (or waste reagents) are typically used alone or in combination:

1) lime (i.e., containing oxides or hydroxides of calcium or magnesium);

2) caustic (i.e., sodium or potassium hydroxides);

3) soda ash (i.e., sodium carbonate);

4) sodium sulfide;

5) ferric sulfate or ferric chloride;

6) alum; or

7) sodium sulfate. Additional flocculating, coagulation, or similar reagents or processes that enhance sludge dewatering characteristics are not precluded from use.

RBERY Thermal recovery of beryllium.

RCGAS Recovery or reuse of compressed gases including techniques such as reprocessing of the gases for reuse or resale; filtering or adsorption of impurities; remixing for direct reuse or resale; and use of the gas as a fuel source.

RCORR Recovery of acids or bases utilizing one or more of the following recovery technologies:

1) distillation (i.e., thermal concentration);

2) ion exchange;

3) resin or solid adsorption;

4) reverse osmosis; or

5) incineration for the recovery of acid

Note: this does not preclude the use of other physical phase separation or concentration techniques such as decantation, filtration (including ultrafiltration), and centrifugation, when used in conjunction with the above listed recovery technologies.

RLEAD Thermal recovery of lead in secondary lead smelters.

RMERC Retorting or roasting in a thermal processing unit capable of volatilizing mercury and subsequently condensing the volatilized mercury for recovery. The retorting or roasting unit (or facility) must be subject to one or more of the following:

a) A federal national emissions standard for hazardous air pollutants (NESHAP) for mercury (subpart E of 40 CFR 61);

b) A best available control technology (BACT) or a lowest achievable emission rate (LAER) standard for mercury imposed pursuant to a prevention of significant deterioration (PSD) permit (including 35 Ill. Adm. Code 201 through 203); or

c) A state permit that establishes emission limitations (within meaning of Section 302 of the Clean Air Act) for mercury, including a permit issued pursuant to 35 Ill. Adm. Code 201. All wastewater and nonwastewater residues derived from this process must then comply with the corresponding treatment standards per USEPA hazardous waste number with consideration of any applicable subcategories (e.g., high or low mercury subcategories).

RMETL Recovery of metals or inorganics utilizing one or more of the following direct physical or removal technologies:

1) ion exchange;

2) resin or solid (i.e., zeolites) adsorption;

3) reverse osmosis;

4) chelation or solvent extraction;

5) freeze crystallization;

6) ultrafiltration; or

7) simple precipitation (i.e., crystallization)

Note:  this does not preclude the use of other physical phase separation or concentration techniques such as decantation, filtration (including ultrafiltration), and centrifugation, when used in conjunction with the above listed recovery technologies.

RORGS Recovery of organics utilizing one or more of the following technolo­gies:

1) Distillation;

2) thin film evaporation;

3) steam stripping;

4) carbon adsorption;

5) critical fluid extraction;

6) liquid-liquid extraction;

7) precipitation or crystallization (including freeze crystallization); or

8) chemical phase separation techniques (i.e., addition of acids, bases, demulsifiers, or similar chemicals).

Note:  This does not preclude the use of other physical phase separation techniques such as decantation, filtration (including ultrafiltration), and centrifugation, when used in conjunction with the above listed recovery technologies.

RTHRM Thermal recovery of metals or inorganics from nonwastewaters in units defined as cement kilns, blast furnaces, smelting, melting and refining furnaces, combustion devices used to recover sulfur values from spent sulfuric acid and "other devices" determined by the Agency pursuant to 35 Ill. Adm. Code 720.110, the definition of "industrial furnace".

RZINC Resmelting in high temperature metal recovery units for the purpose of recovery of zinc.

STABL Stabilization with the following reagents (or waste reagents) or combinations of reagents:

1) Portland cement; or

2) lime or pozzolans (e.g., fly ash and cement kiln dust) – this does not preclude the addition of reagents (e.g., iron salts, sili­cates, and clays) designed to enhance the set or cure time or compressive strength, or to overall reduce the leachability of the metal or inorganic.

SSTRP Steam stripping of organics from liquid wastes utilizing direct application of steam to the wastes operated such that liquid and vapor flow rates, as well as temperature and pressure ranges, have been optimized, monitored, and maintained. These operating parameters are dependent upon the design parameters of the unit, such as, the number of separation stages and the internal column design. Thus resulting in a condensed extract high in organics that must undergo either incineration, reuse as a fuel, or other recovery or reuse and an extracted wastewater that must undergo further treatment as specified in the standard.

WETOX Wet air oxidation performed in units operated such that a surrogate compound or indicator parameter has been substantially reduced in concentration in the residuals (e.g., total organic carbon (TOC) can often be used as an indicator parameter for the oxidation of many organic constituents that cannot be directly analyzed in wastewater residues).

WTRRX Controlled reaction with water for highly reactive inorganic or organic chemicals with precautionary controls for protection of workers from potential violent reactions as well as precautionary controls for potential emissions of toxic or ignitable levels of gases released during the reaction.

Note 1: When a combination of these technologies (i.e., a treatment train) is specified as a single treatment standard, the order of application is specified in Table T by indicating the five letter technology code that must be applied first, then the designation "fb." (an abbreviation for "followed by"), then the five letter technology code for the technology that must be applied next, and so on.

Note 2: When more than one technology (or treatment train) are specified as alternative treatment standards, the five letter technology codes (or the treatment trains) are separated by a semicolon (;) with the last technology preceded by the word "OR". This indicates that any one of these BDAT technologies or treatment trains can be used for compliance with the standard.

BOARD NOTE: Derived from Table 1 in 40 CFR 268.42 (2017).

(Source: Amended at 42 Ill. Reg. 24924, effective November 19, 2018)