Hazardous Waste Identification Guidance Document

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of Public Health
and Environment

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Purpose of this Guidance

This is intended as general guidance for generators of hazardous waste and is meant to assist in compliance with the hazardous waste regulations. The guidance is not meant to modify or replace the adopted regulations which undergo periodic revisions. In the event of a conflict between this guidance and adopted regulations, the regulations govern. Some portions of the hazardous waste regulations are complex and this guidance does not go into details of these complex situations. If a regulatory situation is not described in the guidance or clarification is desired, an official interpretation of a specific hazardous waste regulation can be requested by writing to the Hazardous Materials and Waste Management Division at the address on page 33.

We would appreciate any comments or suggestions for making improvements in future editions. Suggestions or comments can be sent to the address on page 33.

Note: This document has been reformatted to improve accessibility in Portable Document Format (PDF). This opportunity was also used to update the contact information and list of available documents, and to clarify or replace some acronyms. ***Appendices A-D were updated to reflect changes in the regulations.***
No other changes were made unless specifically noted.

HAZARDOUS WASTE IDENTIFICATION
GUIDANCE DOCUMENT

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1.0 INTRODUCTION

Proper hazardous waste identification is important because whether or not a waste qualifies as hazardous usually dictates whether all, some or none of the extensive Resource Conservation and Recovery Act (RCRA) hazardous waste regulations will apply to its handling. Proper hazardous waste identification can also be quite difficult because the RCRA regulations establish a complex definition of the term "hazardous waste."

There are three basic steps in the hazardous waste determination process:

1) determine if your waste meets the definition of a RCRA Subtitle C solid waste, (CDPHE Solid Waste Definition and Solid and Hazardous Waste Exclusions Guidance Document);

2) if so, determine if your waste is excluded from being a RCRA Subtitle C solid or hazardous waste, (CDPHE Solid Waste Definition and Solid and Hazardous Waste Exclusions Guidance Document *and* CDPHE Hazardous Waste Recycling Guidance Document);

3) if not excluded, determine if your waste is a listed hazardous waste and/or exhibits a characteristic of hazardous waste (this document).

Evaluating whether a waste is a RCRA Subtitle C hazardous waste may require detailed process review and reference to U.S. Environmental Protection Agency (EPA) background documents, regulatory preambles, Colorado Hazardous Waste Statute Title 25 Article 15 and/or Colorado Hazardous Waste Regulations 6 CCR 1007-3. If you need assistance in this process, you can request an interpretation on the classification of your waste in writing by providing detailed design and/or process knowledge to the Hazardous Materials and Waste Management Division (the Division) of the Colorado Department of Public Health and Environment (CDPHE, the Department). Unless otherwise noted, all regulatory citations in this document refer to the Colorado Hazardous Waste Regulations.

This document is intended to be used as “plain English” guidance on determining if a waste is a RCRA Subtitle C listed or characteristic hazardous waste. The information in this document is by no means a complete representation of EPA’s or the Department’s regulations or policies. This document is not intended and cannot be relied upon to create any rights, substantive or procedural, enforceable by any party in litigation with Colorado.

2.0 REGULATORY SUMMARY

Under RCRA Subtitle C, Congress granted EPA the authority to regulate hazardous wastes. The principle objective of hazardous waste regulation is the protection of human health and the environment. Hazardous waste regulation is also intended to encourage the conservation and recovery of valuable materials. The definition of solid waste under RCRA, which serves as the starting point for the hazardous waste management system, reflects EPA's effort to obtain the proper balance between these two underlying objectives.

According to the hazardous waste regulations, a material must be a solid waste before it can be considered a hazardous waste. The regulatory definition of solid waste, found in the Colorado Hazardous Waste Regulations 6 CCR 1007-3 Section 261.2(a), encompasses: (1) materials that are abandoned; (2) materials that are recycled; (3) materials that are inherently waste-like; and (4) waste military munitions. Materials that do not fall within one of these broad categories are not subject to regulation as hazardous wastes.

Materials that are recycled are a special subset of the solid waste universe. When recycled, some materials may qualify for an exclusion from the definition of solid waste and fall out of hazardous waste regulation or be subject to less stringent regulatory controls. Based on the material and the type of recycling, the generator of a recyclable solid waste must determine if it is excluded, subject to reduced requirements or subject to full regulation.

2.1 HAZARDOUS WASTE IDENTIFICATION PROCESS

Hazardous waste identification begins with an obvious point: in order for any material to be a hazardous waste, it must first be a waste. A waste is essentially a thing that someone throws away, an item with no value. RCRA uses the term "solid waste" in place of the common term "waste." Under RCRA, the term "solid waste" means any waste, whether in solid, semisolid, liquid, or contained gaseous physical form. Thus, the first step in the RCRA hazardous waste identification process is deciding whether an item qualifies as a RCRA solid waste.

Only a small fraction of all RCRA solid wastes actually qualify as hazardous wastes. At first glance, one would imagine that distinguishing between hazardous and nonhazardous wastes is a simple matter of chemical and toxicological analysis. Other factors must be considered, however, before evaluating the actual hazard that a waste's chemical composition poses. Regulation of certain wastes may be impractical or otherwise undesirable, regardless of the hazards they pose. For instance, household waste often contains dangerous chemicals, but making households subject to the strict RCRA waste management regulations would create a number of practical problems. EPA exempted or excluded certain wastes, like household wastes, from the hazardous waste definition and regulations.

The second step in the hazardous waste determination process requires the generator to determine if the waste fits any of the four categories of exclusions identified in Colorado

Hazardous Waste Regulations (6 CCR 1007-3) Section 261.4. The first category includes wastes that are excluded from being solid wastes (FLOWCHART 1). The second category covers wastes that are excluded from being hazardous wastes (FLOWCHART 2). The other two categories are conditional exclusions that only apply when the provisions established under each section are met. The third category contains an exclusion for hazardous waste generated in raw material, product storage, or manufacturing units. The final category is a limited exclusion for laboratory samples and waste treatability studies. If a waste is excluded under any of these categories, the hazardous waste requirements do not apply, but the waste may still be regulated under other regulatory programs.

Certain wastes are exempt from regulation as hazardous wastes or are subject to special requirements if they are recycled in specific ways (FLOWCHART 3). Only after determining that a solid waste is not somehow excluded from hazardous waste regulation should the analysis proceed to evaluate the actual chemical hazard that a waste poses.

The third step in the hazardous waste identification process is determining whether a waste actually poses a sufficient chemical or physical hazard to merit regulation. This step in the hazardous waste identification process involves evaluating the waste in light of the regulatory definition of hazardous waste, and is the focus of this guidance document. (FLOWCHART 4)

Since proper hazardous waste identification is essential to the success of the hazardous waste management program, the Colorado Hazardous Waste Regulations at 6 CCR 1007-3 Section 262.11 require that any person who produces or generates a waste must determine if that waste is hazardous. In addition to the wastes that EPA considers hazardous, the Department can determine that certain wastes are hazardous wastes if the Colorado Hazardous Waste Commission makes a written finding that such action is necessary to protect public health and the environment. Such Colorado-specific wastes are not regulated as hazardous waste by EPA and other states. The only examples of Colorado-specific hazardous wastes are the listings of chemical munitions mustard, mustard agent and mustard gas.

Some wastes may be identified as hazardous by one or more RCRA hazardous characteristics and/or listings. Process knowledge and origin of the waste is crucial in determining which, if any, hazardous waste codes apply. All applicable hazardous waste codes must be used when managing these wastes. Toluene is a good example. It has a flash point of 40_ F, which would make it an ignitable characteristic hazardous waste with the waste code D001 (Section 261.21) when disposed. If the toluene was used as a solvent, it would also be listed waste code F005 (Section 261.31). If the toluene was a discarded unused commercial chemical product, it would have waste codes D001 and U220 (Sections 261.21 and 261.33(f)). If toluene was used as a carrier agent in paint (not for its solvent properties), the toluene would not cause the paint to be a listed hazardous waste, but the paint as a whole may exhibit one or more hazardous waste characteristics.

Some widely generated wastes are subject to different management standards in order to reduce the regulatory burden while still ensuring the wastes are managed in a way that is protective of human health and the environment. These wastes include certain pesticides, mercury-containing thermostats, batteries, and aerosol cans that contain hazardous waste when discarded (known as Universal Wastes, 6 CCR 1007-3 Part 273) and used oil that is recycled (6 CCR 1007-3 Part 279). If these wastes are managed in accordance with these management standards, the generator is subject to reduced notification requirements, reduced recordkeeping requirements, does not have to use a hazardous waste manifest or hazardous waste transporter to ship their waste, and can store the waste longer than if it were managed under the full hazardous waste requirements.

2.2 DEFINITION OF HAZARDOUS WASTE

There are two basic ways a solid waste may be a hazardous waste: the waste is specifically listed as hazardous in one of the four lists contained in the Colorado hazardous waste regulations and/or the waste possesses a hazardous characteristic. When EPA first developed the RCRA regulations and the definition of hazardous waste in the late 1970s, the Agency focused on establishing the listings and characteristics criteria, allowing industry to identify which wastes warranted regulation as hazardous wastes. Commenters on EPA's original proposed regulations brought up other key questions about the hazardous waste identification process. For example, commenters asked, "once a waste is identified as hazardous, what happens if that waste changes in some way? If the hazardous waste is changed, either by mixing it with other wastes or by treating it to modify its chemical composition, should it still be regulated as hazardous?" Faced with a short time frame for answering this difficult question, EPA developed a fairly simple and strict answer and presented it in the “mixture” and “derived-from” rules. (See Section 2.5)

The hazardous waste listings, the hazardous waste characteristics, and the mixture and derived-from rules are all essential parts of the definition of hazardous waste, but these key elements are all described in different sections of the RCRA regulations. Only one regulatory section, 6 CCR 1007-3 Section 261.3, unites all four elements to establish the formal definition of hazardous waste. 6 CCR 1007-3 Section 261.3 states that all solid wastes exhibiting one of the four hazardous characteristics defined in 6 CCR 1007-3 Part 261, Subpart C, are hazardous wastes. This section also states that all solid wastes listed on one of the four hazardous waste lists in 6 CCR 1007-3 Part 261, Subpart D, are hazardous wastes. Finally, this section explains in detail the mixture and derived-from rules and the seven regulatory exemptions from these rules. Thus, although 6 CCR 1007-3 Section 261.3 is entitled Definition of Hazardous Waste, it serves primarily as a guide to the mixture and derived-from rules. Substantive rules about the two most crucial elements of the hazardous waste definition, the listings and characteristics, are found in 6 CCR 1007-3 Part 261 Subparts C and D.

2.3 LISTED HAZARDOUS WASTE

A hazardous waste listing is a narrative description of a specific type of waste that EPA and the Department consider dangerous enough to warrant regulation. Hazardous waste listings describe wastes from very specific processes, wastes from very specific sectors of industry, or wastes in the form of very specific chemical formulations. Before developing a hazardous waste listing, EPA thoroughly studies a particular waste stream and the threat it can pose to human health and the environment. If the waste poses enough of a threat, EPA includes a precise description of that waste on one of the hazardous waste lists in the regulations. Thereafter, any waste fitting that narrative listing description is considered hazardous, regardless of its chemical composition or any other potential variable. For example, one of the current hazardous waste listings reads as: "API separator sludge from the petroleum refining industry." An API separator is a device commonly used by the petroleum refining industry to separate contaminants from refinery wastewater. After studying the petroleum refining industry and typical sludges from API separators, EPA determined these sludges were dangerous enough to warrant regulation as hazardous waste under all circumstances. The listing therefore designates all petroleum refinery API separator sludges as hazardous. Chemical composition or other factors about a specific sample of API separator sludge are not relevant to its status as a listed hazardous waste under the RCRA program.

Using listings to define hazardous wastes presents certain advantages and disadvantages. One advantage is that listings make the hazardous waste identification process easier for industrial waste handlers. Only knowledge of a waste's origin is needed to determine if it is listed; laboratory analysis is unnecessary to determine if it is RCRA-regulated. Analysis may be needed for other purposes, however.

The use of listings also presents certain disadvantages. For example, listing a waste as hazardous demands extensive study of that waste by EPA. EPA lacks the resources to investigate the countless types of chemical wastes produced in the United States, so the hazardous waste listings simply cannot address all dangerous wastes. The hazardous waste characteristics provide an important complement to listings by addressing most of the shortcomings of the listing methodology of hazardous waste identification.

Another disadvantage of the hazardous waste listings is their lack of flexibility. Listings designate a waste as hazardous if it falls within a particular category or class. The actual composition of the waste is not a consideration as long as the waste matches the appropriate listing description. For instance, some API separator sludges from petroleum refining might contain relatively few hazardous constituents and pose a negligible risk to human health and the environment. Such sludges are still regulated as hazardous, however, because the listing for this waste stream does not consider variations in waste composition. Thus, the hazardous waste listings can unnecessarily regulate some wastes that do not pose a significant health threat. It is

also possible for industries to substantially change their processes so that wastes would no longer meet a listing description in spite of the presence of hazardous constituents. To address such situations, the Colorado hazardous waste regulations Section 260.22 permit any person to petition the Hazardous Waste Commission to exclude a waste or waste-derived material at a particular facility from regulation as hazardous waste.

EPA has studied and listed as hazardous hundreds of specific industrial waste streams. These wastes are described or listed on four different lists, which are found in the regulations in Part 261, Subpart D. These four lists are:

- The F list - The F list designates as hazardous particular wastes from many common business, government, industrial or manufacturing processes. Because the processes producing these wastes can occur in different sectors, the F list wastes are known as waste from nonspecific sources. The F list is found in the regulations at Section 261.31 and is attached as Appendix A.

- The K list - The K list designates as hazardous particular waste streams from specific sectors of industry. K list wastes are known as wastes from specific sources. The K list is found at Section 261.32 and is attached as Appendix B.

- The P list and the U list - These two lists are similar in that both list as hazardous pure or commercial grade formulations of specific unused chemicals. Both the P list and U list are found in Section 261.33. They are also attached as Appendices C and D respectively. Colorado has added chemical munitions mustard, mustard agent and mustard gas to the P list as P909 and P910.

These four lists each designate from 30 to a few hundred waste streams as hazardous. Each waste on the lists is assigned a waste code consisting of the letter associated with the list followed by three numbers. For example, the wastes on the F list are assigned the waste codes F001, F002, and so on. These waste codes are an important part of the RCRA regulatory system. Assigning the correct waste code to a waste has important implications for the management standards that apply to the waste. Bear in mind that some wastes may have more than one applicable waste code. A detailed process review and reference to EPA background documents, regulatory preambles, Colorado Hazardous Waste Statute Title 25 Article 15 and Colorado Hazardous Waste Regulations 6 CCR 1007-3 may be required.

2.3.1 LISTING CRITERIA

Before listing any waste as hazardous, EPA developed a set of criteria to use as a guide when determining whether or not a waste should be listed. These listing criteria provide a consistent frame of reference when EPA considers listing a waste stream. There are four different criteria upon which EPA may base its determination to list a waste as hazardous. These criteria are codified in Part 261, Subpart B. The four reasons why EPA may list a waste are:

- The waste typically contains harmful chemicals, and other factors indicate that it could pose a threat to human health and the environment in the absence of special regulation. Such wastes are known as toxic listed wastes.

- The waste contains such dangerous chemicals that it could pose a threat to human health and the environment even when properly managed. Such wastes are known as acutely hazardous wastes.

- The waste typically exhibits one of the four characteristics of hazardous waste described in the hazardous waste identification regulations (ignitability, corrosivity, reactivity, toxicity).

- EPA has cause to believe that, for some other reason, the waste typically fits within the statutory definition of hazardous waste developed by Congress.

EPA may list a waste as hazardous for any or all of the above reasons. Note that these four criteria do not directly correspond to the four different lists of hazardous waste. The majority of listed wastes fall into the toxic wastes category. To decide if a waste should be a toxic listed waste, EPA first determines whether it typically contains harmful chemical constituents. Appendix VIII of Part 261 contains a list of chemical compounds or elements which scientific studies show to have toxic, carcinogenic, mutagenic, or teratogenic effects on humans or other life forms. If a waste contains chemical constituents found on the Appendix VIII list, EPA then evaluates 11 other factors to determine if the waste stream is likely to pose a threat in the absence of special restrictions on its handling. These additional considerations include a risk assessment and study of past cases of damage caused by the waste. The results of the studies to determine to list a waste as hazardous are contained in the Background Documents published by EPA. These references may be consulted to help in making waste determinations.

Acutely hazardous wastes are the second most common type of listed waste. EPA designates a waste as acutely hazardous if it contains Part 261 Appendix VIII constituents that scientific studies show to be fatal to humans or animals in low doses. In a few cases, acutely hazardous wastes contain no Appendix VIII constituents, but are extremely dangerous for another reason. An example is the listed waste P081, which designates unused discarded formulations of nitroglycerine as acutely hazardous. Although nitroglycerine is not an Appendix VIII hazardous constituent, wastes containing unused nitroglycerine are so unstable that they pose an acute hazard. The criteria for designating a waste as acutely hazardous require only that EPA consider the typical chemical makeup of the waste stream. EPA is not required to study other factors, such as relative risk and evidence of harm, when listing a waste as acutely hazardous.

To indicate its reason for listing a waste, EPA assigns a hazard code to each waste listed on the F, K, P, and U lists. These hazard codes are listed below. The last four hazard codes apply to

wastes that have been listed because they typically exhibit one of the four regulatory characteristics of hazardous waste. The hazard codes indicating the basis for listing a waste are:

Toxic Waste	(T)
Acute Hazardous Waste	(H)
Ignitable Waste	(I)
Corrosive Waste	(C)
Reactive Waste	(R)
Toxicity Characteristic Waste	(E)

The hazard codes assigned to listed wastes affect the regulations that apply to handling the waste. For instance, acute hazardous wastes accompanied by the hazard code (H) are subject to stricter management standards than most other wastes.

2.3.2 THE "F" LIST: WASTES FROM NONSPECIFIC SOURCES

[6 CCR 1007-3 Section 261.31]

The F list (see Appendix A) designates as hazardous particular waste streams from many common processes used in laboratories, automotive repair shops, retail outlets, and government facilities as well as several industrial and manufacturing wastes. F list wastes usually consist of chemicals that have been used for their intended purpose in an industrial-type process. That is why F list wastes are often referred to as "manufacturing process wastes." The F list wastes can be divided into seven groups, depending on the type of process or operation that created them. The seven categories of F-listed wastes are:

- Spent solvent wastes (F001 - F005);
- Wastes from electroplating and other metal finishing operations (F006 - F012, F019);
- Dioxin-bearing wastes (F020 - F023 and F026 - F028);
- Wastes from the production of certain chlorinated aliphatic hydrocarbons (F024, F025);
- Wastes from wood preserving (F032, F034, and F035);
- Petroleum refinery wastewater treatment sludges (F037 and F038);
- Multi-source leachate (F039).

2.3.2.1 SPENT SOLVENT WASTES

Waste codes F001 - F005 apply to waste streams from the use of certain common organic solvents. Solvents are chemicals with many uses, although they are most often used in degreasing or cleaning. The solvents covered by the F listings are commonly used in mechanical repair, dry cleaning, electronics manufacturing, and laboratories. EPA determined that only certain solvents used in certain ways produce waste streams that warrant a hazardous waste listing. The solvents were listed on the basis of their toxicity, ignitability, or both.

A number of key factors must be evaluated in order to determine whether the F001 - F005 waste codes apply to a particular waste. First, one or more of the 31 specific organic solvents designated in the F001 - F005 listing description must have been used in the operation that created the waste. Second, the listed solvent must have been used in a particular manner; it must have been used for its "solvent properties" such as cleaning, degreasing, or extracting.
The F001 - F005 spent solvent listings provide a good illustration of a principle common to all listed hazardous wastes. To determine whether a waste qualifies as listed, knowledge of the process that created the waste is essential, while information about the waste's specific chemical composition is less important. For example, the F005 listing description can allow two different wastes with identical chemical contents to be regulated differently because of subtle differences in the processes that created the wastes. A waste made up of toluene (an F005 solvent) and paint is listed if the toluene has been used to clean the paint from brushes or some other surface. A waste with the same chemical composition is not F005 if the toluene has been used as an ingredient (such as a thinner) in the paint. EPA considers use as a cleaner to be "use as a solvent;" use as an ingredient does not qualify as solvent use. “Use as a solvent” also includes processes where the chemical is used to dissolve other materials or to extract them as in certain chemical manufacturing, laboratory and pharmaceutical processes. Knowledge of the process that created a waste is the key in evaluating whether a waste can be a hazardous spent solvent or other listed hazardous waste.

Finally, EPA determined that only a waste stream created through the use of concentrated solvents should be listed. Thus, the concentration of the solvent formulation or product before its use in the process that created the waste is also a factor in determining the applicability of the F001 - F005 listing. In order to be an F001, F002, F004, or F005 listed waste, a spent solvent or solvent blend must have a total of 10% or more by volume (before use) of the solvents listed. Spent solvent mixtures containing only F003 solvents are regulated at all concentrations since EPA could not be assured that at levels below 10% the waste would not be ignitable. Spent solvent mixtures containing one or more F003 solvents and a total of 10% or more by volume (before use) of one or more of the solvents listed in F001, F002, F004, or F005 are also listed hazardous wastes.

EXAMPLES

1) A spent solvent mixture consisting of 9% methyl ethyl ketone by volume (before use) in a nonhazardous carrier solution is not a listed hazardous waste (<10% total listed solvents).

2) A spent solvent mixture consisting of 10% methyl ethyl ketone by volume (before use) in a nonhazardous carrier solution is an F005 listed hazardous waste (Æ10% total listed solvents).

3) A spent solvent mixture consisting of 7% methyl ethyl ketone and 6% benzene by volume (before use) in a nonhazardous carrier solution is an F005 listed hazardous waste (Æ10% total listed solvents).

4) A spent solvent mixture consisting of 4% methyl ethyl ketone, 3% tetrachloroethylene, 6% methylene chloride and 2% nitrobenzene by volume (before use) in a nonhazardous carrier solution is an F001/F002/F004/F005 listed hazardous waste (Æ10% total listed solvents).

5) A spent solvent mixture consisting of 5% acetone by volume (before use) in a nonhazardous carrier solution is an F003 listed hazardous waste (mixtures containing only F003 solvents are regulated at all concentrations so long as it meets the ignitability characteristic).

6) A spent solvent mixture consisting of 95% acetone and 5% methyl ethyl ketone (before use) is a D001 ignitable characteristic hazardous waste (does not meet the listing for F003 since it contains more than just F003 solvent but <10% total of other listed solvent; flash point <140_ F).

2.3.2.2 WASTES FROM ELECTROPLATING AND OTHER METAL-FINISHING OPERATIONS

The listed hazardous wastes F006 - F012 and F019 are wastes commonly produced during electroplating and other metal finishing operations. The Background Document for the listing of hazardous wastes (US EPA May 2, 1980) defines electroplating as the application of a surface coating, usually but not always by electro-deposition, to provide corrosion protection, erosion resistance, anti-frictional characteristics or decoration. Electroplating processes include metal electroplating, anodizing, chemical conversion coating (e.g. coloring, chromating, phosphating, and immersion plating), electroless plating, chemical etching and milling, and printed circuit board manufacturing.

Diverse industries, ranging from jewelry manufacture to automobile production, use electroplating and other methods to change the surface of metal objects . A variety of techniques can be used to do this. Electroplating uses electricity to deposit a layer of a decorative or protective metal on the surface of another metal object. Chemical conversion coating also changes the surface of a metal, but does so by chemically converting a layer of the original base metal into a protective coating. Because each of these processes produces different types of wastes, EPA only designated wastes from certain metal-finishing operations as hazardous. The first step in determining whether one of the F006-F012 or F019 listings applies to a waste is identifying the type of metal finishing process involved in creating the waste:

- F006 - F009 listings only apply to wastes from electroplating operations;
- F010 - F012 listings only apply to wastes from metal heat treating operations;
- the F019 listing only applies to wastes from chemical conversion coating of aluminum.

Evaluating whether a waste meets the listing description may require detailed process review and reference to EPA background documents or regulatory preambles.

EXAMPLES

1) Company A uses a sulfuric acid anodizing process in photographic plate manufacturing. The sulfuric acid process is specifically excepted from the F006 listing because this process does not involve any of the specific constituents on which the F006 listing is based. The hazardous constituents which are the basis for the F006 listing are cadmium, hexavalent chromium, nickel, and cyanide (complexed) [Part 261 Appendix VII]. Therefore, the listing is intended to cover those processes which include these constituents.

2) Company B uses a conversion coating process utilizing zirconium phosphate in the manufacture of aluminum end stock, but does not manufacture the aluminum cans themselves. The conversion coating process creates a sludge that does not contain cyanide or chromium (the basis for the F019 listing [Part 261 Appendix VII]), and does not exhibit any hazardous waste characteristics. The F019 exemption for zirconium phosphating in aluminum can washing applies to the wastewater treatment sludge even though Company B doesn't make the cans because the conversion process was determined to be an integral part of aluminum can manufacturing.

3) Company C does galvanizing on carbon steel in the manufacturing of sheet metal products. Also, the company has a small plating line that does cadmium plating(using cyanides) on fixtures that will get saltwater exposure. The wastewaters from the cadmium plating line are treated in the same wastewater treatment system as the wastewaters from the galvanizing line. The volume of waste sludges produced from treatment of galvanizing wastewaters is very great and concentrations of cadmium and cyanide are frequently undetectable and always well below a hazardous waste characteristic. All of the sludges from the wastewater treatment are F006 listed hazardous waste because they result from treatment of the cadmium cyanide plating wastewaters. If the galvanizing wastewaters were treated in a separate wastewater system they would not produce a F006 listed waste because zinc plating on carbon steel (galvanizing) is specifically exempted.

2.3.2.3 DIOXIN-BEARING WASTES

The listed wastes F020 - F023 and F026 - F028 are commonly known as the "dioxin-bearing wastes." These listings describe a number of waste streams that EPA believes are likely to contain dioxins. The dioxin listings apply primarily to manufacturing process wastes from the production of specific pesticides or specific chemicals used in the production of pesticides. The F027 listing warrants special notice because it does not apply to used manufacturing wastes. It applies only to certain unused pesticide formulations. F027 is in fact the only listing on the F list or K list that describes an unused chemical rather than an industrial waste stream consisting of chemicals that have served their intended purpose. With the exception of F028, all of the dioxin-bearing wastes are considered acute hazardous wastes and are designated with the hazard code (H). These wastes are therefore subject to stricter management standards than other hazardous wastes.

2.3.2.4 WASTES FROM THE PRODUCTION OF CERTAIN CHLORINATED ALIPHATIC HYDROCARBONS

The F024 and F025 listings designate as hazardous certain waste streams produced in the manufacture of chlorinated aliphatic hydrocarbons. These listings stand out on the F list (the list of wastes from nonspecific sources) because they focus on wastes from a very narrow industrial sector. Many other waste streams from the manufacture of organic chemicals are listed on the K list, the list of wastes from specific sources.

2.3.2.5 WOOD PRESERVING WASTES

The F032, F034, and F035 listings apply to certain wastes from wood preserving processes. Most wood used for construction or other non-fuel applications is chemically treated to slow the deterioration caused by decay and insects. Such chemical treatment is especially evident in telephone poles, railroad cross ties, and other wood products prepared to withstand the rigors of outdoor usage.

Wood preservation typically involves coating lumber with pentachlorophenol, creosote, or preservatives containing arsenic or chromium. The wood preserving process creates a number of common waste streams containing these chemicals, including process residuals, wastewaters, preservative drippage, and spent formulations. Once wood has been treated with a preservative, it is normally placed in a storage yard where excess preservative drips from the lumber. The F032, F034, and F035 listings designate this preservative drippage as listed hazardous waste. Whether the F032, F034, or F035 listings apply to a particular wood preserving waste depends entirely on the type of preservative used at the facility. Waste from wood preservation processes using pentachlorophenol is F032, waste from processes using creosote is F034, and waste from processes treating wood with arsenic or chromium is F035. K001 also applies to some wood preserving wastes, specifically the bottom sediment sludge from the treatment of wastewater from wood preserving processes that use creosote and/or pentachlorophenol.

These listings apply to certain wood preserving process wastes and not to the finished product. Finished treated wood products may exhibit one or more hazardous waste characteristics, however. For example, creosote-treated wood may exhibit the toxicity characteristic for creosols. The waste generated by non-household entities who utilize arsenic-treated wood or wood products for their intended end use are specifically excluded in Section 261.4(b)(9). Households are exempt completely from the hazardous waste regulations in Section 261.4(b)(1).

2.3.2.6 PETROLEUM REFINERY WASTEWATER TREATMENT SLUDGES

The F037 and F038 listings apply to specific waste streams from petroleum refineries. The petroleum refining process typically creates large quantities of contaminated wastewater. Before this wastewater can be discharged to a river or sewer, it must be treated to remove oil, solid material, and chemical pollutants. Gravity provides a simple way of separating these pollutants

from refinery wastewaters. Over time, solids and heavier pollutants precipitate from wastewaters to form a sludge. Other less dense pollutants accumulate on the surface of wastewaters, forming a material known as float. These gravitational separation processes can be encouraged through chemical or mechanical means. The F037 listing applies to the sludges and float created by gravitational separation of oil/water solids during the treatment of petroleum refinery wastewaters. The F038 listing applies to sludges and float created during the chemical and/or physical separation of oil/water solids of refinery wastewater. In addition, two very specific types of petroleum refinery wastewater residues are covered under the "K" listing.

2.3.2.7 MULTI-SOURCE LEACHATE

The F039 listing applies to multi-source leachate, the liquid material that has percolated through land-disposed waste in surface impoundments, waste piles, old burial sites, or landfills. Understanding the natural phenomenon known as leaching is essential to understanding a number of key RCRA regulations. Leaching occurs when liquids, such as rainwater, filter through soil or buried materials, such as wastes placed in a landfill. When this liquid comes in contact with buried wastes, it leaches or draws contaminants out of those wastes. This liquid (called leachate) then can carry the leached contaminants further into the ground, eventually depositing them elsewhere in the subsurface or in groundwater. The leachate that percolates through landfills, particularly hazardous waste landfills, may contain high concentrations of contaminants, and is often collected to minimize the potential that it may enter the subsurface environment and contaminate soil or groundwater. The leachate that percolates through hazardous waste landfills and other buried hazardous waste is designated as F039.

Interpretive Guidance

Key factors in determining whether the F039 listing description applies to a waste are 1) verifying the presence of leachate and 2) the nature of the waste at the time of generation of the leachate. For purposes of this listing description, leachate is formed when any liquid percolates through a land-disposed waste. If the waste itself is a liquid, it is not leachate when it leaks or is discharged from a disposal area.

For a leachate to be considered multi-source leachate, it must be produced from more than one waste stream and the waste streams must have at least one differing waste code. This is commonly the case for leachate formed from landfills where multiple waste streams were disposed and the wastes had different hazardous waste codes.

Multi-source leachate is not produced when leachate is formed from a single waste stream that has more than one hazardous waste code at the time of disposal, such as an ignitable solvent with waste codes D001 and F001. The same is true of a waste stream that is a mixture of wastes with differing waste codes. For example, plating wastes with an F006 waste code might be bulked with wastewater sludges from aluminum conversion coating having an F019 waste code. The resulting waste mixture would have the waste codes F019 and F006 at the time of disposal. Any leachate formed from passing through the combined

waste stream would also have waste codes F019 and F006, not F039. Leachates produced from such wastes mixtures are not multi-source leachate because the leachate is formed from a single combined waste stream with multiple waste codes.

Comingling of plumes of contaminated ground water containing leachate from discretely separate sources also does not produce wastes with the F039 listing even though differing listing codes might apply to each plume.

2.3.3 THE "K" LIST: WASTES FROM SPECIFIC SOURCES

[6 CCR 1007-3 Section 261.32]

The K list of hazardous wastes (see Appendix B) designates particular wastes from specific sectors of industry and manufacturing as hazardous. The K list wastes are therefore known as wastes from specific sources. K list wastes are manufacturing process wastes that contain chemicals that have been used for their intended purpose. To determine whether a waste qualifies as K-listed, two primary questions must be answered. First, is the facility that created the waste within 1 of the 17 different industrial or manufacturing categories on the K list? Second, does the waste match one of the specific K list waste descriptions? The 17 industries that can generate K list wastes are:

- Wood preservation;
- Inorganic pigment manufacturing;
- Organic chemicals manufacturing;
- Inorganic chemicals manufacturing;
- Pesticides manufacturing;
- Explosives manufacturing;
- Petroleum refining;
- Iron and steel production;
- Primary copper production;
- Primary lead production;
- Primary zinc production;
- Primary aluminum production;
- Ferroalloy production;
- Secondary lead processing;
- Veterinary pharmaceuticals manufacturing;
- Ink formulation;
- Coking (processing of coal to produce coke, a material used in iron and steel production).

In general, the K listings target much more specific waste streams than the F listings. For example, EPA recently added a number of listings to the organic chemicals manufacturing category of the K list. These new listings are for wastes from the production of carbamate

chemicals. EPA estimates that only two dozen facilities nationwide produce waste streams covered by these new K listings. In contrast, F-listed spent solvent wastes are commonly generated at thousands of different sites and facilities. Industries that generate K-listed wastes, such as the wood preserving and petroleum refining industries, can also generate F-listed wastes. Typically, K listings describe more specific waste streams than F listings applicable to the same industry. For example, K051 and K048 designate as hazardous two very specific types of petroleum refinery wastewater treatment residues: wastewater treatment sludges created in API separators and wastewater treatment float created using dissolved air flotation (DAF) pollution control devices. The F037 and F038 listings complement these two K listings by designating as hazardous all other types of petroleum refinery wastewater treatment sludges and floats. These petroleum refinery listings illustrate that the K listings are typically more specific than the F listings, but they also illustrate that the two lists are in many ways very similar.

2.3.4 THE "P" AND "U" LISTS: DISCARDED COMMERCIAL CHEMICAL PRODUCTS

[6 CCR 1007-3 261.33]

Regulatory Requirement

261.33 Discarded commercial chemical products, off-specification species, container residues, and spill residues thereof.

The following materials or items are hazardous wastes if and when they are discarded or intended to be discarded as described in § 261.2(a)(2)(I), when they are mixed with waste oil or used oil or other material and applied to the land for dust suppression or road treatment, when they are otherwise applied to the land in lieu of their original intended use or when they are contained in products that are applied to the land in lieu of their original intended use, or when, in lieu of their original intended use, they are produced for use as (or as a component of) a fuel, distributed for use as a fuel, or burned as a fuel, or when they are residues described in § 261.33(d) and are not recycled in accordance with § 261.2(e) within 90 days of the initial spill event.

(a) Any commercial chemical product, or manufacturing chemical intermediate having the generic name listed in paragraphs (e) or (f) of this section.

(b) Any off-specification commercial product or manufacturing chemical intermediate which, if it met specifications, would have the generic name listed in paragraphs (e) or (f) of this section.

(c) Any residue remaining in a container or in an inner liner removed from a container that has held any commercial chemical product or manufacturing chemical intermediate

having the generic name listed in paragraph (e) or (f) of this section, unless the container is empty as defined in § 261.7(b) of these regulations.

(d) Any residue or contaminated soil, water or other debris resulting from the cleanup of a spill into or on any land or water of any commercial chemical product or manufacturing chemical intermediate having the generic name listed in paragraph (a) through (d) of this section, or any residue or contaminated soil, water or other debris resulting from the cleanup of a spill, into or on any land or water, of any off-specification chemical product and manufacturing intermediate which, if it met specifications, would have the generic name listed in paragraphs (e) or (f) of this section.

(e) The commercial chemical products, manufacturing chemical intermediates or off-specification commercial chemical products or manufacturing chemical intermediates referred to in paragraphs (a) through (d) of this section, are identified as acute hazardous wastes (H) and are subject to the small quantity exclusion defined in § 261.5(e)."

(f) The commercial chemical products, manufacturing chemical intermediates, or off-specification commercial chemical products referred to in paragraphs (a) through (d) of this section, are identified as toxic wastes (T), unless otherwise designated and are subject to the small quantity generator exclusion defined in § 261.5(a) and (g).

The P (see Appendix C) and U (see Appendix D) lists designate as hazardous commercial grade and off-specification formulations of certain unused chemicals or manufacturing chemical intermediates. The P and U listings are quite different from the F and K listings. For a waste to qualify as P- or U-listed, it must meet the following three criteria:

- the waste must contain one of the chemicals listed on the P or U list;
- the chemical in the waste must be unused;
- the chemical in the waste must be in the form of a "commercial chemical product," as EPA defines that term.

Typically, hazardous waste listings are narrative descriptions of specific waste streams and specific chemical composition are generally irrelevant to whether a listing applies to it. At first glance, the P and U listings seem inconsistent with these principles. Each P and U listing

consists only of the chemical name of a compound known to be toxic or otherwise dangerous; no more detailed description is included. EPA adopted this format because the same narrative description applies to all P and U list wastes. Instead of appearing next to each one of the hundreds of P and U list waste codes, this description is found in the regulatory text that introduces the two lists.

The P and U list waste description involves two key factors. First, a P or U listing applies only if one of the listed chemicals is discarded unused. In other words, the P and U lists do not apply to process wastes, as do the F and K lists. The P and U listings apply to unused chemicals that become wastes. Unused chemicals become wastes for a number of reasons. For example, some unused chemicals are spilled by accident. Others are intentionally discarded because they are off-specification and cannot serve the purpose for which they were originally produced.

The second key factor governing the applicability of the P or U listings is that the listed chemical must be discarded in the form of a "commercial chemical product." The phrase "commercial chemical product" applies to a chemical that has the generic name of that chemical. It may include the chemical in pure form, in commercial grade form, or that is an active ingredient in a chemical formulation that has the generic name of the chemical. Manufacturing chemical intermediates that have the generic name of the chemical also are "commercial chemical products." A chemical is an active ingredient in a formulation if that chemical serves the function of the formulation. For instance, a pesticide made for killing insects may contain a poison such as heptachlor as well as various solvent ingredients which act as carriers or lend other desirable properties to the poison. Although all of these chemicals may be capable of killing insects, only the heptachlor serves the primary purpose of the insecticide product. The other chemicals involved are present for other reasons, not because they are poisonous. Therefore, heptachlor is the "active" ingredient in such a formulation even though it may be present in low concentrations.

EPA's regulations include a footnote to the P and U listing noting that the listed chemical must be the sole active ingredient to meet the listing description. **Colorado's regulations do not include the footnote regarding sole active ingredients. In Colorado, chemicals may have more than one active ingredient and still meet the listing description if the formulation has the generic name of the chemical.**

The P and U listings apply only to a very narrow category of wastes. For example, an unused pesticide consisting of pure heptachlor is listed waste P059 when discarded. An unused pesticide consisting of pure toxaphene is listed waste P123 when discarded. An unused pesticide made up of 50 percent heptachlor and 50 percent toxaphene as active ingredients, while being just as deadly as the first two formulations, is not a listed waste when discarded, unless the formulation goes by the generic name of one of the chemicals. Wastes that remain unregulated by listings may still fall under protective hazardous waste regulation due to the four characteristics of hazardous waste.

Nonlisted wastes that do not exhibit any of the hazardous characteristics are solid wastes subject to continued management under the Colorado Solid Waste Regulations (6 CCR 1007-2). The generator may need to obtain approval from the Department and/or the landfill owner/operator, or, in the case of disposal to the sanitary sewer the permission of the wastewater treatment authority, before disposal at a solid waste landfill or sanitary sewer system. As a practical

matter, many of these industrial wastes are not disposed in solid waste landfills or the sanitary sewer system without some form of treatment before disposal.

Any person may petition the Colorado Hazardous Waste Commission to exclude a waste or waste-derived material at a particular facility from being defined as a hazardous waste by demonstrating to the satisfaction of the Commission that their waste doesn't meet any of the criteria under which the waste was listed as a hazardous waste (6 CCR 1007-3 Section 260.20). This can be accomplished by demonstrating that their waste doesn't exhibit the relevant characteristic for which the waste was listed, that it doesn't contain the relevant constituent(s) that caused the waste to be listed, or that it doesn't fit any of the criterion used for identifying hazardous wastes.

2.4 CHARACTERISTIC HAZARDOUS WASTES [6 CCR 1007-3 261.21 - 261.24]

A hazardous waste characteristic is a property which, when present in a waste, indicates that the waste poses a sufficient threat to merit regulation as hazardous. When defining hazardous waste characteristics, EPA did not study particular waste streams from specific industries. Instead, EPA asked the question, "what properties or qualities can a waste have which cause that waste to be dangerous?" For example, EPA found that ignitability, or the tendency for a waste to easily catch fire and burn, is a dangerous property. Thus, ignitability is one of the hazardous waste characteristics and a waste displaying that property is regulated as hazardous.

When defining hazardous waste characteristics, EPA attempted to identify analytical tests capable of detecting or demonstrating the presence of the characteristic. Some of the hazardous characteristics are defined by a narrative description and do not have a specific test. The chemical makeup or other factors about the composition of a particular waste typically determine whether or not it exhibits a hazardous characteristic. Generators may use process information or other knowledge of the hazardous properties of the material to make the hazardous waste determination. Site-specific or industry-based information may indicate that certain waste streams are hazardous or not based on chemical or physical information from the design and operation of the process. Such wastes do not specifically require analysis to determine if the wastes are hazardous, although some analysis will normally be required for treatment or disposal purposes. Process information is important when selecting the amount and types of analytical testing that may be required to make an adequate determination or to confirm a determination. There are many sources for process information to help in making the hazardous waste determination including judicious use of Material Safety Data Sheets (MSDS), process design information, quality control data, industry reference materials, and agency references.

Using characteristics to define hazardous wastes presents certain advantages over designating hazardous wastes by listings. One advantage is that hazardous characteristics and the tests used to evaluate their presence have broad applicability. Once EPA has defined a characteristic and selected a test for use in identifying it, waste handlers can evaluate any waste stream to see if it is classified as a hazardous waste. Furthermore, use of characteristics can be a more equitable way

of designating wastes as hazardous. Instead of categorizing an entire group of wastes as hazardous, characteristics allow a waste handler to evaluate each waste on its own merits and classify it according to the actual danger it poses.

Aware of these advantages, EPA originally planned to use characteristics as the primary means of identifying hazardous waste. EPA hoped to define and select test methods for identifying all hazardous characteristics, including organic toxicity, mutagenicity (the tendency to cause genetic mutations), teratogenicity (the tendency to cause defects in offspring), bioaccumulation potential, and phytotoxicity (toxicity to plants). EPA encountered problems, however, when trying to develop regulatory definitions of these properties. One primary problem was that no straightforward testing protocol was available for use in determining if a waste possessed one of these characteristics. For example, deciding if a particular waste stream poses an unacceptable cancer risk demands extensive laboratory experimentation. Requiring such analysis on a routine basis from industrial waste handlers would be impractical. Therefore, EPA developed a hazardous waste definition that relies on both listings and characteristics to define a hazardous waste.

Given these criteria, EPA finalized four hazardous waste characteristics. These characteristics are a necessary supplement to the hazardous waste listings. They provide a screening mechanism that waste handlers must apply to all wastes from all industries. In this sense, the characteristics provide a more complete and inclusive means of identifying hazardous wastes than do the hazardous waste listings. The four characteristics of hazardous waste are:

- Ignitability, including oxidizers;
- Corrosivity;
- Reactivity;
- Toxicity.

The regulations explaining these characteristics and the test methods to be used in detecting their presence are found in Part 261 Subpart C. Waste handlers can use the test methods referenced in Subpart C to determine whether a waste displays characteristics or may apply knowledge of the waste's properties and processes that generated them to determine if it exhibits a characteristic. As with listed wastes, characteristic wastes are assigned waste codes. Ignitable, corrosive, and reactive wastes carry the waste codes D001, D002, and D003, respectively. Wastes displaying the characteristic of toxicity can carry any of the waste codes D004 through D043.

Many wastes that have been determined not to be hazardous wastes may still be dangerous and have special handling requirements for disposal. Nonhazardous wastes continue to be managed under the Colorado Solid Waste Regulations.

2.4.1 IGNITABILITY [6 CCR 1007-3 261.21]

Regulatory Requirement

"A solid waste exhibits the characteristic of ignitability if a representative sample of the waste has any of the following properties:

(1) It is a liquid, other than an aqueous solution containing less than 24 percent alcohol by volume, and has a flash point less than 60°C (140°F), as determined by a Pensky-Martens Closed Cup Tester, using the test method specified in ASTM Standard D-93-79 or D-93-80 (incorporated by reference, see § 260.11), or a Setaflash Closed Cup Tester, using the test method specified in ASTM standard D-3278-78 (incorporated by reference, see § 260.11), or as determined by an equivalent test method approved by the Department under the procedures set forth in §§ 260.20 and 260.21.

(2) It is not a liquid and is capable, under standard temperature and pressure, of causing fire through friction, absorption of moisture, or spontaneous chemical changes and, when ignited, burns so vigorously and persistently that it creates a hazard.

(3) It is an ignitable compressed gas as defined in 49 CFR § 173.300 and as determined by the test methods described in that regulation or equivalent test methods approved by the Department under §§ 260.20 and 260.21.

(4) It is an oxidizer as defined in 49 CFR § 173.127.

A solid waste that exhibits the characteristic of ignitability has the EPA Hazardous Waste Number of D001." [1]

Ignitable wastes are wastes which can readily catch fire and sustain combustion. Many paints, cleaners, and other industrial wastes pose such a fire hazard. Most ignitable wastes are liquid in physical form. EPA selected a flash point test as the method for determining whether a liquid waste is combustible enough to deserve regulation as hazardous. The flash point test determines the lowest temperature at which a chemical ignites when exposed to flame. Common examples of ignitable liquid wastes include ethanol, petroleum ether, acetone, and benzene.

Many wastes in solid form (e.g., wood, paper) can also readily catch fire and sustain combustion, but EPA did not intend to regulate most of these materials as ignitable wastes. A nonliquid

[1] The citation for oxidizer as defined in 49 CFR was corrected in the Colorado Hazardous Waste Regulations from 49 CFR 173.151 to 49 CFR 173.127 effective March 2, 1998. Appendix E includes the definition of oxidizer from 49 CFR 173.127.

waste is only hazardous due to ignitability if it can spontaneously catch fire under normal handling conditions and can burn so vigorously that it creates a hazard. For example, petroleum contaminated soils are not ignitable hazardous wastes because they do not readily catch fire under normal handling conditions even though the contained liquids may be capable of catching fire. On the other hand, white phosphorous is an ignitable solid hazardous waste because it has an autoignition temperature of 70_F (It will spontaneously ignite in air at temperatures above 70_F). Certain compressed gases are also ignitable.

Oxidizers are materials "that may, generally by yielding oxygen, cause or enhance the combustion of other materials" [49 CFR 173.127]. They may accelerate burning when involved in a fire and may ignite other combustibles like wood or paper with their flare-like burning. Oxidizers may explode if exposed to heat or may react explosively when exposed to air. Examples of strong oxidizers include hydrogen peroxide, potassium permanganate, and sodium nitrite.

2.4.2 CORROSIVITY [6 CCR 1007-3 261.22]

Regulatory Requirement

"A solid waste exhibits the characteristic of corrosivity if a representative sample of the waste has either of the following properties:

(1) It is aqueous and has a pH less than or equal to 2 or greater than or equal to 12.5, as determined by a pH meter using Method 9040 in "Test Methods for the Evaluation of Solid Waste, Physical/Chemical Methods, "EPA Publication SW-846, as incorporated by reference in § 260.11 of these regulations.

(2) It is a liquid and corrodes steel (SAE 1020) at a rate greater than 6.35 mm (0.250 inch) per year at a test temperature of 55^{o}C (130^{o}F) as determined by the test method specified in NACE (National Association of Corrosion Engineers) Standard TM-01-69 as standardized in "Test Methods for the Evaluation of Solid Waste, Physical/Chemical Methods, "EPA Publication SW-846, as incorporated by reference in § 260.11 of these regulations.

A solid waste that exhibits the characteristic of corrosivity has the EPA Hazardous Waste Number of D002."

Corrosive wastes are acidic or alkaline (basic) wastes which can readily corrode or dissolve flesh, metal, or other materials. They are also among the most common hazardous waste streams. Waste sulfuric acid from automotive batteries and potassium hydroxide are two examples of corrosive wastes.

There are two criteria to identify corrosive hazardous wastes. The first is a pH test. Wastes with a pH greater than or equal to 12.5 or less than or equal to 2 are corrosive under the hazardous waste regulations. A waste may also be corrosive if it has the ability to corrode steel in a specific EPA-approved test protocol. Wastes must be aqueous or liquid to be corrosive hazardous waste; non-liquid wastes do not meet the definition for corrosivity. Common examples include potassium hydroxide, formic acid, and hydrochloric acid.

2.4.3 REACTIVITY [6 CCR 1007-3 261.23]

Regulatory Requirement

"A solid waste exhibits the characteristic of reactivity if a representative sample of the waste has any of the following properties:

(1) It is normally unstable and readily undergoes violent change without detonating.

(2) It reacts violently with water.

(3) It forms potentially explosive mixtures with water.

(4) When mixed with water, it generates toxic gases, vapors or fumes in a quantity sufficient to present a danger to human health or the environment.

(5) It is a cyanide or sulfide bearing waste which, when exposed to pH conditions between 2 and 12.5 can generate toxic gases, vapors or fumes in a quantity sufficient to present a danger to human health or the environment.

(6) It is capable of detonation or explosive reaction if it is subjected to a strong initiating source or if heated under confinement.

(7) It is readily capable of detonation or explosive decomposition or reaction at standard temperature and pressure.

(8) It is a forbidden explosive as defined in 49 CFR § 173.54, or a Class 1, Division 1.1, 1.2, or 1.3 explosive as defined in 49 CFR § 173.50.

A solid waste that exhibits the characteristic of reactivity, has the EPA Hazardous Waste Number of D003." [2]

[2] The citation for forbidden explosive as defined in 49 CFR was corrected in the Colorado Hazardous Waste Regulations from 49 CFR 173.51 to 49 CFR 173.54; for Class A explosive in 49 CFR 173.53 and Class B explosive in 49 CFR 173.88 to Class 1, Division 1.1, 1.2, or 1.3 explosives in 49 CFR 173.50 effective March 2, 1998. Appendix E includes the definitions of forbidden explosive and Class 1 explosive from 49 CFR 173.54 and 173.50 respectively.

A reactive waste is one that readily explodes, undergoes violent reactions, or creates a health hazard from the release of toxic gases from the waste. Common examples of reactive wastes include discarded munitions, crystallized picric acid, potassium cyanide, and sodium. Examples of wastes that undergo violent reactions with water include acetic anhydride and potassium peroxide, which may cause spattering of the water and generate much heat. In many cases, there is no reliable test method to evaluate a waste's potential to explode or react violently under common handling conditions. Therefore, EPA uses narrative criteria to define most reactive wastes and allows waste handlers to use their best judgment in determining if a waste is sufficiently reactive to be regulated. This is possible because reactive hazardous wastes are relatively uncommon and the dangers they pose are well known to the few waste handlers who deal with them.

If chemical references indicate that chemicals in the waste can be explosive, it is prudent to consider the waste reactive. There are specific tests used by the U.S. Bureau of Mines and the Department of Transportation to determine if materials are explosive. These tests may provide information on the explosive character of wastes but are not definitive. Some wastes which pass these tests are still reactive. Simply put, they may still blow up. Some materials may not exhibit the reactive characteristic when new, but may change to be reactive with age. For example, nitrocellulose film may become reactive with age. Operational experience may provide the only good information in defining the wastes as reactive.

There are common procedures to keep explosive reactive wastes from spontaneously reacting, including submerging in oil or water. Following such procedures usually does not change the fact that the waste is still reactive, but lowers the probability of an uncontrolled reaction. This is not considered treatment since it is necessary for safe handling and management of certain wastes. Procedures used to destroy reactives are considered treatment and require a permit. For example, detonating the reactive or adding a stabilizer to peroxides is considered treatment.

For wastes containing cyanide or sulfide, EPA and Department guidance directs that wastes with less than 250 mg/kg total cyanide or 500 mg/kg total sulfide are not reactive; but if over these levels, the generator must determine how much is available for release. Wastes exposed to the test conditions defined in section 7.3.3.2 of SW-846, Third Edition, exhibiting total releasable cyanide of 250 mg HCN/kg of waste are considered to be reactive hazardous waste. Wastes exposed to the test conditions defined in section 7.3.4.2 of SW-846, Third Edition, exhibiting total releasable sulfide of 500 mg H2S/kg of waste are considered to be reactive hazardous wastes.

2.4.4 TOXICITY CHARACTERISTIC [6 CCR 1007-3 261.24]

Regulatory Requirement

"A solid waste exhibits the characteristic of toxicity if, using the Toxicity Characteristic Leaching Procedure, Test Method 1311 in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, EPA Publication SW-846, as incorporated by reference in §260.11 of these regulations, the extract from a representative sample of the waste contains any of the contaminants listed in Table 1 at a concentration equal to or greater than the respective value given in that Table. Where the waste contains less than 0.5 percent filterable solids, the waste itself, after filtering using the methodology outlined in Method 1311, is considered to be the extract for the purpose of this section."

A solid waste that exhibits the characteristic of toxicity has the EPA Hazardous Waste Number specified in Table 1 which corresponds to the toxic contaminant causing it to be hazardous."

The leaching of toxic compounds or elements into groundwater drinking supplies from wastes disposed in landfills is one of the most common ways the general population can be exposed to the chemicals found in industrial wastes. EPA developed a characteristic designed to identify wastes likely to leach dangerous concentrations of certain known toxic chemicals into groundwater. Thirty nine chemicals were listed by EPA for the toxicity characteristic, including some heavy metals (e.g. lead, arsenic), pesticides (e.g. silvex, chlordane), volatiles (e.g.. chloroform, carbon tetrachloride), base neutrals (e.g. pyridine, hexachlorobenzene), and acid extracts (e.g. cresols, pentachlorophenol).

In order to predict whether a particular waste is likely to leach chemicals into groundwater in the absence of special restrictions on its handling, EPA designed a lab procedure which replicates the leaching process and other effects that occur when wastes are buried in a typical landfill.

This lab procedure is known as the Toxicity Characteristic Leaching Procedure (TCLP). Using the TCLP on a representative waste sample creates a liquid leachate that is similar to the liquid expected to be found in the ground near a landfill containing the same waste. Once the leachate is created in the lab, a waste handler must determine whether it contains any of the 39 different toxic chemicals above specified regulatory levels (see Appendix F). If the leachate sample contains a sufficient concentration of one or more of the specified chemicals, the waste exhibits the toxicity characteristic.

EPA used groundwater modeling studies and toxicity data for a number of common toxic compounds and elements to set these threshold concentration levels. Much of the toxicity data were originally developed under the Safe Drinking Water Act. If a waste exhibits the toxicity characteristic, it carries the waste code associated with the compound or element which exceeded

the regulatory level. The table in Appendix F presents the toxicity characteristic waste codes, regulated constituents, and regulatory levels.

Interpretive Guidance

Total constituent analysis can be used if the waste is a solid and contains less than 20 times the maximum contaminant level (MCL) for the constituent. A waste containing less than 20 times the MCL for a constituent can't exhibit the toxicity characteristic for that constituent even if 100% of the constituent in the waste leaches out because of the dilution factor inherent in the TCLP test. To make the hazardous waste determination for wastes containing more than 20 times the MCL for a constituent, the TCLP should be run or the waste handler may assume the waste is hazardous and manage it accordingly. For example, if a waste fluorescent light tube contains less than 4 mg/l of mercury in a total constituent test, it would not be a characteristic hazardous waste for this constituent (MCL for mercury is 0.2 mg/l; 20 times 0.2 equals 4 mg/l).

2.5 THE MIXTURE AND DERIVED-FROM RULES

The mixture and derived-from rules operate differently for listed waste and characteristic waste.

2.5.1 MIXTURE RULE [6 CCR 1007-3 261.3(a)(2)(iii) & (iv)]

Regulatory Requirement

"(iii) It is a mixture of a solid waste and a hazardous waste that is listed in Subpart D solely because it exhibits one or more of the characteristics of hazardous waste identified in Subpart C, unless the resultant mixture no longer exhibits any characteristic of hazardous waste identified in Subpart C of this part, or unless the solid waste is excluded from regulation under § 261.4(b)(7) and the resultant mixture no longer exhibits any characteristic of hazardous waste identified in Subpart C of this part for which the hazardous waste listed in Subpart D of this part was listed. (However, nonwastewater mixtures are still subject to the requirements of Part 268 of these regulations, even if they no longer exhibit a characteristic at the point of land disposal).

(iv) It is a mixture of solid waste and one or more hazardous wastes listed in Subpart D and has not been excluded from this paragraph under §§ 260.20 and 260.22; however, the following mixtures of solid wastes and hazardous wastes listed in Subpart D are not hazardous wastes (except by application of paragraph (a)(2) (I) or (ii) of this Section) if the generator can demonstrate that the mixture consists of wastewater the discharge of which is subject to regulation under either Section 402 or Section 307(b) of the Clean Water Act (including wastewater at facilities which have eliminated the discharge of wastewater) and:....."

The mixture rule for listed wastes basically states that, unless it meets one of the exclusions, a mixture made up of any amount of a nonhazardous solid waste and any amount of a listed hazardous waste is considered a listed hazardous waste. In other words, if a small vial of listed hazardous waste is mixed with a large quantity of nonhazardous waste, the resulting mixture bears the same waste code and regulatory status as the original listed component of the mixture. This principle applies regardless of the actual threat posed by the waste mixture or the mixture's chemical composition.
The mixture rule for listed wastes applies to the mixture at the point in which the material is determined to be a waste, not to its status while still a useful product. There is a difference between a chemical that is mixed with other materials in order to use the chemical for its intended purpose versus mixing the chemical after it is determined to be a waste.

In contrast, a mixture involving solely characteristic hazardous wastes is hazardous only if the mixture itself exhibits a RCRA hazardous characteristic. Remember, however, that a waste may be hazardous because it contains more than one listed and/or characteristic hazardous waste. The waste would bear all of the waste codes applicable.

EXAMPLES

1) An automotive repair shop uses a solvent blend of 6% methyl ethyl ketone (MEK) in water for light parts cleaning (mixture flash point >140_ F). While preparing this blend, a few ounces of MEK spill onto the floor and are mopped up with several paper towels. The paper towels are damp, but not soaked with MEK. The solvent blend is not an F-listed hazardous waste upon disposal because it contained less than 10% MEK before use. The solvent blend would not be a U-listed hazardous waste because the MEK was used for its intended purpose and is no longer a commercial chemical product or chemical intermediate. The paper towels are a U-listed hazardous waste, however, because they have been mixed with a listed hazardous waste (spilled MEK, waste code U159). Depending on the amount of MEK on the paper towels, they may exhibit the ignitable characteristic as well.

2.5.2 DERIVED-FROM RULE [6 CCR 1007-3 261.3(c)]

Regulatory Requirement

"261.3(c)(2)(I) Except as otherwise provided in paragraph (c)(2)(ii) of this section, any solid waste generated from the treatment, storage, or disposal of a hazardous waste, including any sludge, spill residue, ash, emission control dust, or leachate (but not including precipitation run-off) is a hazardous waste. (However, materials that are reclaimed from solid wastes and that are used beneficially are not solid wastes and hence are not hazardous wastes under this provision unless the reclaimed material is burned for energy recovery or used in a manner constituting disposal)."

The derived-from rule governs the regulatory status of materials that are created by treating or changing a hazardous waste in some way. For example, ash created by burning a hazardous waste is considered "derived-from" that hazardous waste. The derived-from rule for listed wastes states that any material derived from the treatment, storage, or disposal of a listed hazardous waste is also a listed hazardous waste. Thus, ash produced by burning a listed hazardous waste bears that same waste code and regulatory status as the original listed waste, regardless of the ash's actual properties.

The net effect of the mixture and derived-from rules for listed wastes can be summarized as follows: once a waste matches a listing description, it is forever a listed hazardous waste, regardless of how it is mixed, treated, or otherwise changed. Furthermore, any material that becomes contaminated with the listed waste is also considered to be listed hazardous waste, regardless of its chemical composition.

Treatment residues and materials derived from characteristic hazardous wastes are hazardous only if they themselves exhibit a hazardous characteristic. Unlike listed hazardous wastes, characteristic wastes are hazardous because they possess one of four unique properties. EPA determined that once a characteristic waste no longer exhibits one of these four dangerous properties, it no longer warrants regulation as hazardous. Thus, a characteristic hazardous waste can be made nonhazardous by treating it to remove its hazardous property. However, EPA and the Department place certain restrictions on the manner in which a waste can be treated. Handlers who make characteristic wastes nonhazardous must consider these restrictions when treating wastes to remove their hazardous properties.

To understand the logic behind the mixture and derived-from rules, one must consider the circumstances under which EPA developed them. If EPA relied solely on the narrative listing

descriptions to govern when a waste ceased being hazardous, waste handlers might circumvent RCRA's protective regulation. For example, a waste handler could simply mix different wastes and claim that they no longer exactly matched the applicable hazardous waste listing descriptions. These wastes would no longer be regulated by RCRA, even though the chemicals they contained would continue to pose the same threats to human health and the environment. EPA was not able to determine what sort of treatment or concentrations of chemical constituents indicated that a waste no longer deserved regulation. EPA therefore adopted the simple and conservative approach of the mixture and derived-from rules, while admitting that these rules might make some waste mixtures and treatment residues subject to unnecessary regulation.

Adopting the mixture and derived-from rules also presented certain advantages. For instance, the mixture rule gives waste handlers a clear incentive to keep their listed hazardous wastes segregated from other nonhazardous or less dangerous waste streams. The greater the volume of hazardous waste, the more expensive it is to store, treat and dispose.

The RCRA regulations do provide some relief from the mixture and derived-from rule principles for listed hazardous wastes. Through a process known as delisting, a waste handler can petition the Department to prove that a waste meeting a hazardous waste listing description does not deserve RCRA regulation. Because the delisting process may be difficult, time-consuming, and expensive, it is not considered a readily available exception to the mixture and derived-from rules.

There are a few situations in which EPA and the Department do not require strict application of the mixture and derived-from rules. EPA determined that certain mixtures involving listed wastes and certain residues from the treatment of listed wastes typically do not pose enough of a health or environmental threat to deserve regulation as listed wastes. The seven principal regulatory exclusions from the mixture and derived-from rules are summarized below.

2.5.3 EXEMPTIONS

Mixture Rule

The first exemption from the mixture rule applies to mixtures of solid wastes and wastes listed solely because they exhibit characteristics.

Regulatory Requirement - Section 261.3(a)(2)(iii)

> *"Mixtures of a solid waste and a listed hazardous waste that is listed in Subpart D solely because it exhibits one or more of the characteristics of hazardous waste are hazardous wastes, unless the resultant mixture no longer exhibits any characteristic of hazardous waste or the solid waste is excluded from regulation and the resultant mixture no longer exhibits any characteristic of hazardous waste identified in Subpart C of this part for which the hazardous waste was listed."*

EPA can list a waste as hazardous if that waste typically exhibits one or more of the four hazardous waste characteristics. If a hazardous waste listed only for a characteristic is mixed with a solid waste, the original listing does not carry through to the resulting mixture if that mixture does not exhibit any hazardous waste characteristics. For example, EPA listed the F003 spent solvents as hazardous because these wastes typically display the ignitability characteristic. If F003 waste is mixed with another waste, and the resulting mixture does not exhibit a characteristic, the F003 listing no longer applies. Be aware, however, that in another set of regulations called the Land Disposal Restrictions (LDR), EPA and the Department place certain controls on how hazardous wastes can be treated or mixed with other wastes. For example, hazardous wastes cannot be diluted in order to avoid having to do adequate treatment to comply with the land disposal restrictions. Any hazardous waste mixing must be consistent with these rules. On the other hand, EPA listed the F002 spent solvents as hazardous because they are toxic wastes (not toxicity characteristic). If F002 waste is mixed with another waste, the F002 listing still applies.

A second exemption from the mixture rule applies to certain listed hazardous wastes that are discharged to wastewater treatment facilities. This exemption is sometimes referred to as the de minimis wastewater mixture rule. Many industrial facilities produce large quantities of nonhazardous wastewaters as their primary waste streams. These wastewaters are typically discharged to a water body or local sewer system after being treated to remove pollutants, as required by the Clean Water Act. At many of these large facilities, on-site cleaning, chemical spills, or laboratory operations also create relatively small secondary waste streams that are hazardous due to listings or characteristics. For example, a textile plant producing large quantities of nonhazardous wastewater can generate a secondary waste stream of listed spent solvents from cleaning equipment. Routing such secondary hazardous waste streams to the facility's wastewater treatment system is a practical way of treating and getting rid of these wastes. This management option triggers the mixture rule, however, since even a very small amount of a listed waste stream combined with very large volumes of nonhazardous wastewater causes the entire mixture to be listed. EPA provided an exemption from the mixture rule for a number of these situations where relatively small quantities of listed hazardous wastes are routed to large-volume wastewater treatment systems. To qualify for this exemption from the mixture rule, the amount of listed waste introduced into a wastewater treatment system must be very small (or de minimis) relative to the total amount of wastewater treated in the system.

A third exemption from the mixture rule applies to mixtures involving characteristic wastes and specific mining and beneficiation wastes. This narrow exemption allows certain mixtures to qualify as nonhazardous wastes, even if the mixtures exhibit one or more hazardous waste characteristics.

Derived-from Rule

There are four regulatory exemptions from the derived-from rule. The first of these derived-from rule exemptions applies to materials that are reclaimed from hazardous wastes and used beneficially. Many listed and characteristic hazardous wastes can be recycled to make new products or can be processed to recover usable materials with economic value. Such products derived from recycled hazardous wastes are no longer wastes. Since they are not wastes, these derived from materials are not hazardous wastes. As a result of trying to ensure proper management of recyclable wastes while encouraging recycling, wastes that are recycled are covered by some of the most complex portions of the regulations. Waste handlers should contact the Division for guidance on the regulatory status of their particular waste stream(s) if they are considering recycling as an option.

The last three exemptions from the derived-from rule apply to residues from the treatment of specific wastes using very specific treatment processes. For example, K062 describes spent pickle liquor from the iron and steel industry. Pickle liquor is an acid solution used to finish the surface of steel. When pickle liquor is spent and becomes a waste, it usually contains acids and toxic heavy metals. This waste can be treated by mixing it with lime to form a sludge. This treatment, called stabilization, neutralizes the acids in the pickle liquor and makes the metals less

dangerous by chemically binding them into the sludge. EPA studied this process and determined that K062 treated in this manner no longer poses enough of a threat to warrant hazardous waste regulation. Therefore lime-stabilized waste pickle liquor sludge derived from K062 is not a listed hazardous waste. The other exemptions from the derived-from rule for listed wastes are also quite specific.

2.6 CONTAMINATED MEDIA AND DEBRIS: THE CONTAINED-IN POLICY

The historical EPA policy governing management of contaminated environmental media and debris has been referred to as the "Contained-in Policy." Contaminated environmental media (e.g. soil, ground water, sod) and debris (disposable personal protective equipment, disposable sampling equipment) are dealt with in the regulations differently than other mixtures with hazardous waste. The distinctions for both contaminated media and debris are important because some situations allow for management of mixtures with listed wastes as nonhazardous wastes.

Environmental media are not themselves solid wastes, and so can't be hazardous wastes, but they can contain hazardous waste. When environmental media contain listed hazardous waste or contain enough hazardous constituents to exhibit a hazardous waste characteristic, they must be managed as hazardous wastes. In order for environmental media contaminated with a listed waste to no longer be considered hazardous, the handler of that media must demonstrate to the Department's satisfaction that it no longer poses a sufficient health threat to deserve RCRA regulation. Handlers of contaminated media and debris containing listed hazardous wastes must obtain the Department's concurrence before disposing of such media as nonhazardous. Guidance on management of contaminated environmental media is described in the Department's draft "Interim Final Policy and Guidance on Management of Investigation Derived Wastes (IDW) at RCRA Facilities." The contained-in policy provides an easier option for eliminating unwarranted hazardous waste regulation for low-risk listed wastes than the process of delisting a hazardous waste mentioned previously. The delisting process demands extensive sampling and analysis, submission of a formal petition, and rulemaking by the Colorado Hazardous Waste Commission. A determination that environmental media no longer contain a listed hazardous waste can be granted on a site-specific basis by the Department.

Debris is solid waste and can, therefore, be hazardous waste. Debris becomes a hazardous waste when it is contaminated with any listed hazardous waste and/or if it contains enough hazardous constituents to exhibit a hazardous waste characteristic. Since debris is a solid waste, it must be managed appropriately even when it is not a hazardous waste. Debris, whether natural or manmade, pose significantly different problems from other types of wastes and specific requirements were developed under the land disposal restriction regulations (Part 268) to deal with those issues. Examples of debris include:

- dismantled construction materials such as used bricks, wood beams, and chunks of concrete;
- decommissioned industrial equipment such as pipes, pumps, and tanks;

- other discarded manufactured objects such as personal protective equipment (gloves, coveralls, eyewear);
- large, naturally occurring objects such as tree trunks and boulders.

The specific regulatory definitions and provisions for management of debris are listed below.

Regulatory Requirement - Section 268.2

Section 268.2(g) ***"Debris"*** *means solid material exceeding a 60 mm particle size intended for disposal and that is: A manufactured object; or plant or animal matter; or natural geologic material. However, the following materials are not debris: Any material for which a specific treatment standard is provided in Subpart D, Part 268, namely lead acid batteries, cadmium batteries, and radioactive lead solids; Process residuals such as smelter slag and residues from the treatment of waste, wastewater, sludges, or air emission residues; and intact containers of hazardous waste that are not ruptured and that retain at least 75% of their original volume. A mixture of debris that has not been treated to the standards provided by § 268.45 and other material is subject to regulation as debris if the mixture is comprised primarily of debris, by volume, based on visual inspection.*

Section 268.2 (h) "Hazardous debris" means debris that contains a hazardous waste listed in Subpart D of Part 261 of these regulations, or that exhibits a characteristic of hazardous waste identified in Subpart C of Part 261 of these regulations."

A specific exclusion from the mixture and derived-from rules for debris is given in Section 261.3:

"Section 261.3(f) Notwithstanding paragraphs (a) through (d) of this section and provided the debris as defined in Part 268 of these regulations does not exhibit a characteristic identified at Subpart C of this part, the following materials are not subject to regulation under Parts 260, 261 to 267, 268, or 100:

(1) Hazardous debris as defined in Part 268 of these regulations that has been treated using one of the required extraction or destruction technologies specified in Table 1 of Section 268.45 of these regulations; persons claiming this exclusion in an enforcement action will have the burden of proving by clear and convincing evidence that the material meets all of the exclusion requirements; or

(2) Debris as defined in Part 268 of these regulations that the Director, considering the extent of contamination, has determined is no longer contaminated with hazardous waste."

Interpretive Guidance:

Generators or treatment facilities claiming the exclusion under Section 261.3(f)(1) should keep records of the disposition of the wastes that include documentation of the specific treatment unit used and that it qualifies for the technology in Section 268.45. The treatment facility must keep records that the actual treatment of the waste met the performance requirements for the specific extraction or destruction technology.

Generators wishing to claim the exclusion under Section 261.3(f)(2) must submit information to the Division that shows that the concentration of hazardous waste contained in the debris does not pose a significant threat. Debris that meets the risk levels described in the draft "Interim Final Policy and Guidance on Management of Investigation Derived Wastes (IDW) at RCRA Facilities" would be considered to meet this requirement. Other information regarding the nature of the debris and its management may also be considered by the Division in making these determinations. Contact the Division directly to discuss use of this exclusion.

3.0 CONTACT INFORMATION

24-hour Emergency Response Line (toll-free)	(877) 518-5608
Colorado Department of Public Health and Environment	(303) 692-2000
(CDPHE) toll-free	(800) 886-7689
Pollution Prevention Program	(303) 692-2977
Hazardous Materials and Waste Management Division	(303) 692-3300
(HMWMD) toll-free	(888) 569-1831
HMWMD Technical Assistance Line	(303) 692-3320
(HMWMD Technical Assistance) toll-free	(888)569-1831 ext. 3320

CDPHE Website	http://www.cdphe.state.co.us/
HMWMD Website	http://www.cdphe.state.co.us/hm/
Downloadable Regulations	http://www.cdphe.state.co.us/regulate.asp
HMWMD Internet e-mail	comments.hmwmd@state.co.us

Other Phone Numbers:

National Response Center	(800) 424-8802
RCRA/Superfund Hotline	(800) 424-9346

Send questions in writing to:

Colorado Department of Public Health and Environment
Hazardous Materials and Waste Management Division
Technical Assistance
4300 Cherry Creek Drive South
Denver, CO 80246-1530

OR

FAX (303) 759-5355

Please provide as much detail as possible regarding your question and the waste or process to which it applies.

4.0 RELATED CDPHE REFERENCES

These documents are available on our website or by contacting the HMWMD technical assistance line.

Colorado Hazardous Waste Statute Title 25 Article 15 Part 101 et seq CRS 1992, as amended.

Colorado Hazardous Waste Regulations 6 CCR 1007-3.

"CDPHE Solid Waste Definition and Solid and Hazardous Waste Exclusions Guidance Document," September 1998.

"CDPHE Hazardous Waste Recycling Guidance Document," January 1999.

"Guide to Generator Requirements of the Colorado Hazardous Waste Regulations," October 2001.

"Hazardous Waste Transporters Guidance Document," November 1999.

"Treatment of Hazardous Waste by Generators Guidance Document," April 2000.

"Satellite Accumulation for Small and Large Quantity Generators of Hazardous Waste," February 1998.

"Personnel Training for Large Quantity Generators of Hazardous Waste," March 1997.

"Preparedness and Prevention Contingency Plan Emergency Procedures for Large Quantity Generators of Hazardous Waste," March 1997.

"Personnel Training & Emergency Response/Preparedness and Prevention for Small Quantity Generators," April 1998

"Guide to Implementing the Division's Wastewater Treatment Unit Policy," January 2000.

Compliance Bulletins:

- Batteries
- Contaminated Shop Towels and Reusable Absorbents
- Electronics Waste Management
- EPA Identification Number
- Lead-based Paint Abatement and Waste Management
- LIghting Wastes
- Management of Waste Aerosol Cans
- Photographic, X-ray and Dental Wastes
- Universal Waste Rule
- Used Antifreeze

APPENDIX A § 261.31 Hazardous wastes from non-specific sources

Industry and EPA hazardous waste No.	Hazardous waste	Hazard code
Generic:		
F001	The following spent halogenated solvents used in degreasing: Tetrachloroethylene, trichloroethylene, methylene chloride, 1,1,1-trichloroethane, carbon tetrachloride, and chlorinated fluorocarbons; all spent solvent mixtures/blends used in degreasing containing, before use, a total of ten percent or more (by volume) of one or more of the above halogenated solvents or those solvents listed in F002, F004, and F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.	(T)
F002	The following spent halogenated solvents: Tetrachloroethylene, methylene chloride, trichloroethylene, 1,1,1-trichloroethane, chlorobenzene, 1,1,2-trichloro-1,2,2-trifluoroethane, ortho-dichlorobenzene, trichlorofluoromethane, and 1,1,2-trichloroethane; all spent solvent mixtures/blends containing, before use, a total of ten percent or more (by volume) of one or more of the above halogenated solvents or those listed in F001, F004, or F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.	(T)
F003	The following spent non-halogenated solvents: Xylene, acetone, ethyl acetate, ethyl benzene, ethyl ether, methyl isobutyl ketone, n-butyl alcohol, cyclohexanone, and methanol; all spent solvent mixtures/blends containing, before use, only the above spent non-halogenated solvents; and all spent solvent mixtures/blends containing, before use, one or more of the above non-halogenated solvents, and, a total of ten percent or more (by volume) of one or more of those solvents listed in F001, F002, F004, and F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.	(I)*
F004	The following spent non-halogenated solvents: Cresols and cresylic acid, and nitrobenzene; all spent solvent mixtures/blends containing, before use, a total of ten percent or more (by volume) of one or more of the above non-halogenated solvents or those solvents listed in F001, F002, and F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.	(T)
F005	The following spent non-halogenated solvents: Toluene, methyl ethyl ketone, carbon disulfide, isobutanol, pyridine, benzene, 2-ethoxyethanol, and 2-nitropropane; all spent solvent mixtures/blends containing, before use, a total of ten percent or more (by volume) of one or more of the above non-halogenated solvents or those solvents listed in F001, F002, or F004; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.	(I,T)
F006	Wastewater treatment sludges from electroplating operations except from the following processes: (1) Sulfuric acid anodizing of aluminum; (2) tin plating on carbon steel; (3) zinc plating (segregated basis) on carbon steel; (4) aluminum or zinc-aluminum plating on carbon steel; (5) cleaning/stripping associated with tin, zinc and aluminum plating on carbon steel; and (6) chemical etching and milling of aluminum.	(T)
F007	Spent cyanide plating bath solutions from electroplating operations.	(R, T)
F008	Plating bath residues from the bottom of plating baths from electroplating operations where cyanides are used in the process.	(R, T)
F009	Spent stripping and cleaning bath solutions from electroplating operations where cyanides are used in the process.	(R, T)
F010	Quenching bath residues from oil baths from metal heat treating operations where cyanides are	(R, T)

Industry and EPA hazardous waste No.	Hazardous waste	Hazard code
	used in the process.	
F011	Spent cyanide solutions from salt bath pot cleaning from metal heat treating operations.	(R, T)
F012	Quenching waste water treatment sludges from metal heat treating operations where cyanides are used in the process.	(T)
F019	Wastewater treatment sludges from the chemical conversion coating of aluminum except from zirconium phosphating in aluminum can washing when such phosphating is an exclusive conversion coating process.	(T)
F020	Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production or manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tri- or tetrachlorophenol, or of intermediates used to produce their pesticide derivatives. (This listing does not include wastes from the production of Hexachlorophene from highly purified 2,4,5-trichlorophenol.).	(H)
F021	Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production or manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of pentachlorophenol, or of intermediates used to produce its derivatives.	(H)
F022	Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tetra-, penta-, or hexachlorobenzenes under alkaline conditions.	(H)
F023	Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production of materials on equipment previously used for the production or manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tri- and tetrachlorophenols. (This listing does not include wastes from equipment used only for the production or use of Hexachlorophene from highly purified 2,4,5-trichlorophenol.).	(H)
F024	Process wastes, including but not limited to, distillation residues, heavy ends, tars, and reactor clean-out wastes, from the production of certain chlorinated aliphatic hydrocarbons by free radical catalyzed processes. These chlorinated aliphatic hydrocarbons are those having carbon chain lengths ranging from one to and including five, with varying amounts and positions of chlorine substitution. (This listing does not include wastewaters, wastewater treatment sludges, spent catalysts, and wastes listed in § 261.31 or § 261.32.).	(T)
F025	Condensed light ends, spent filters and filter aids, and spent desiccant wastes from the production of certain chlorinated aliphatic hydrocarbons, by free radical catalyzed processes. These chlorinated aliphatic hydrocarbons are those having carbon chain lengths ranging from one to and including five, with varying amounts and positions of chlorine substitution.	(T)
F026	Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production of materials on equipment previously used for the manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tetra-, penta-, or hexachlorobenzene under alkaline conditions.	(H)
F027	Discarded unused formulations containing tri-, tetra-, or pentachlorophenol or discarded unused formulations containing compounds derived from these chlorophenols. (This listing does not include formulations containing Hexachlorophene synthesized from prepurified 2,4,5-trichlorophenol as the sole component.).	(H)
F028	Residues resulting from the incineration or thermal treatment of soil contaminated with EPA Hazardous Waste Nos. F020, F021, F022, F023, F026, and F027.	(T)
F032	Wastewaters (except those that have not come into contact with process contaminants), process residuals, preservative drippage, and spent formulations from wood preserving processes generated at plants that currently use or have previously used chlorophenolic formulations (except potentially	(T)

Industry and EPA hazardous waste No.	Hazardous waste	Hazard code
	cross-contaminated wastes that have had the F032 waste code deleted in accordance with § 261.35 of these regulations or potentially cross-contaminated wastes that are otherwise currently regulated as hazardous wastes (i.e., F034 or F035), and where the generator does not resume or initiate use of chlorophenolic formulations). This listing does not include K001 bottom sediment sludge from the treatment of wastewater from wood preserving processes that use creosote and/or pentachlorophenol.	
F034	Wastewaters (except those that have not come into contact with process contaminants), process residuals, preservative drippage, and spent formulations from wood preserving processes generated at plants that use creosote formulations. This listing does not include K001 bottom sediment sludge from the treatment of wastewater from wood preserving processes that use creosote and/or pentachlorophenol.	(T)
F035	Wastewaters (except those that have not come into contact with process contaminants), process residuals, preservative drippage, and spent formulations from wood preserving processes generated at plants that use inorganic preservatives containing arsenic or chromium. This listing does not include K001 bottom sediment sludge from the treatment of wastewater from wood preserving processes that use creosote and/or pentachlorophenol.	(T)
F037	Petroleum refinery primary oil/water/solids separation sludge-Any sludge generated from the gravitational separation of oil/water/solids during the storage or treatment of process wastewaters and oily cooling wastewaters from petroleum refineries. Such sludges include, but are not limited to, those generated in oil/water/solids separators; tanks and impoundments; ditches and other conveyances; sumps; and stormwater units receiving dry weather flow. Sludge generated in stormwater units that do not receive dry weather flow, sludges generated from non-contact once-through cooling waters segregated for treatment from other process or oily cooling waters, sludges generated in aggressive biological treatment units as defined in § 261.31(b)(2) (including sludges generated in one or more additional units after wastewaters have been treated in aggressive biological treatment units) and K051 wastes are not included in this listing. This listing does include residuals generated from processing or recycling oil-bearing hazardous secondary materials excluded under § 261.4(a)(13)(i), if those residuals are to be disposed of.	(T)
F038	Petroleum refinery secondary (emulsified) oil/water/solids separation sludge-Any sludge and/or float generated from the physical and/or chemical separation of oil/water/solids in process wastewaters and oily cooling wastewaters from petroleum refineries. Such wastes include, but are not limited to, all sludges and floats generated in: induced air flotation (IAF) units, tanks and impoundments, and all sludges generated in DAF units. Sludges generated in stormwater units that do not receive dry weather flow, sludges generated from non-contact once-through cooling waters segregated for treatment from other process or oily cooling waters, sludges and floats generated in aggressive biological treatment units as defined in § 261.31(b)(2) (including sludges and floats generated in one or more additional units after wastewaters have been treated in aggressive biological treatment units) and F037, K048, and K051 wastes are not included in this listing.	(T)
F039	Leachate (liquids that have percolated through land disposed wastes) resulting from the disposal of more than one restricted waste classified as hazardous under subpart D of this part. (Leachate resulting from the disposal of one or more of the following EPA Hazardous Wastes and no other Hazardous Wastes retains its EPA Hazardous Waste Number(s): F020, F021, F022, F026, F027, and/or F028.).	(T)

FOOTNOTE: *(I,T) should be used to specify mixtures containing ignitable and toxic constituents.

APPENDIX B § 261.32 Hazardous waste from specific sources

Industry and EPA hazardous waste No.	Hazardous waste	Hazard code
Wood preservation:		
K001	Bottom sediment sludge from the treatment of wastewaters from wood preserving processes that use creosote and/or pentachlorophenol.	(T)
Inorganic pigments:		
K002	Wastewater treatment sludge from the production of chrome yellow and orange pigments.	(T)
K003	Wastewater treatment sludge from the production of molybdate orange pigments.	(T)
K004	Wastewater treatment sludge from the production of zinc yellow pigments.	(T)
K005	Wastewater treatment sludge from the production of chrome green pigments.	(T)
K006	Wastewater treatment sludge from the production of chrome oxide green pigments (anhydrous and hydrated).	(T)
K007	Wastewater treatment sludge from the production of iron blue pigments.	(T)
K008	Oven residue from the production of chrome oxide green pigments.	(T)
Organic chemicals:		
K009	Distillation bottoms from the production of acetaldehyde from ethylene.	(T)
K010	Distillation side cuts from the production of acetaldehyde from ethylene.	(T)
K011	Bottom stream from the wastewater stripper in the production of acrylonitrile.	(R, T)
K013	Bottom stream from the acetonitrile column in the production of acrylonitrile.	(R, T)
K014	Bottoms from the acetonitrile purification column in the production of acrylonitrile.	(T)
K015	Still bottoms from the distillation of benzyl chloride.	(T)
K016	Heavy ends or distillation residues from the production of carbon tetrachloride.	(T)
K017	Heavy ends (still bottoms) from the purification column in the production of epichlorohydrin.	(T)
K018	Heavy ends from the fractionation column in ethyl chloride production.	(T)
K019	Heavy ends from the distillation of ethylene dichloride in ethylene dichloride production.	(T)
K020	Heavy ends from the distillation of vinyl chloride in vinyl chloride monomer production.	(T)
K021	Aqueous spent antimony catalyst waste from fluoromethanes production.	(T)

Industry and EPA hazardous waste No.	Hazardous waste	Hazard code
K022	Distillation bottom tars from the production of phenol/acetone from cumene.	(T)
K023	Distillation light ends from the production of phthalic anhydride from naphthalene.	(T)
K024	Distillation bottoms from the production of phthalic anhydride from naphthalene.	(T)
K025	Distillation bottoms from the production of nitrobenzene by the nitration of benzene.	(T)
K026	Stripping still tails from the production of methy ethyl pyridines.	(T)
K027	Centrifuge and distillation residues from toluene diisocyanate production.	(R, T)
K028	Spent catalyst from the hydrochlorinator reactor in the production of 1,1,1-trichloroethane.	(T)
K029	Waste from the product steam stripper in the production of 1,1,1-trichloroethane.	(T)
K030	Column bottoms or heavy ends from the combined production of trichloroethylene and perchloroethylene.	(T)
K083	Distillation bottoms from aniline production.	(T)
K085	Distillation or fractionation column bottoms from the production of chlorobenzenes.	(T)
K093	Distillation light ends from the production of phthalic anhydride from ortho-xylene.	(T)
K094	Distillation bottoms from the production of phthalic anhydride from ortho-xylene.	(T)
K095	Distillation bottoms from the production of 1,1,1-trichloroethane.	(T)
K096	Heavy ends from the heavy ends column from the production of 1,1,1-trichloroethane.	(T)
K103	Process residues from aniline extraction from the production of aniline.	(T)
K104	Combined wastewater streams generated from nitrobenzene/aniline production.	(T)
K105	Separated aqueous stream from the reactor product washing step in the production of chlorobenzenes.	(T)
K107	Column bottoms from product separation from the production of 1,1-dimethylhydrazine (UDMH) from carboxylic acid hydrazides.	(C,T)
K108	Condensed column overheads from product separation and condensed reactor vent gases from the production of 1,1-dimethylhydrazine (UDMH) from carboxylic acid hydrazides.	(I,T)
K109	Spent filter cartridges from product purification from the production of 1,1-dimethylhydrazine (UDMH) from carboxylic acid hydrazides.	(T)
K110	Condensed column overheads from intermediate separation from the production of 1,1-dimethylhydrazine (UDMH) from carboxylic acid hydrazides.	(T)
K111	Product washwaters from the production of dinitrotoluene via nitration of toluene.	(C,T)

Industry and EPA hazardous waste No.	Hazardous waste	Hazard code
K112	Reaction by-product water from the drying column in the production of toluenediamine via hydrogenation of dinitrotoluene.	(T)
K113	Condensed liquid light ends from the purification of toluenediamine in the production of toluenediamine via hydrogenation of dinitrotoluene.	(T)
K114	Vicinals from the purification of toluenediamine in the production of toluenediamine via hydrogenation of dinitrotoluene.	(T)
K115	Heavy ends from the purification of toluenediamine in the production of toluenediamine via hydrogenation of dinitrotoluene.	(T)
K116	Organic condensate from the solvent recovery column in the production of toluene diisocyanate via phosgenation of toluenediamine.	(T)
K117	Wastewater from the reactor vent gas scrubber in the production of ethylene dibromide via bromination of ethene.	(T)
K118	Spent adsorbent solids from purification of ethylene dibromide in the production of ethylene dibromide via bromination of ethene.	(T)
K136	Still bottoms from the purification of ethylene dibromide in the production of ethylene dibromide via bromination of ethene.	(T)
K149	Distillation bottoms from the production of alpha- (or methyl-) chlorinated toluenes, ring-chlorinated toluenes, benzoyl chlorides, and compounds with mixtures of these functional groups, (This waste does not include still bottoms from the distillation of benzyl chloride.).	(T)
K150	Organic residuals, excluding spent carbon adsorbent, from the spent chlorine gas and hydrochloric acid recovery processes associated with the production of alpha- (or methyl-) chlorinated toluenes, ring-chlorinated toluenes, benzoyl chlorides, and compounds with mixtures of these functional groups.	(T)
K151	Wastewater treatment sludges, excluding neutralization and biological sludges, generated during the treatment of wastewaters from the production of alpha- (or methyl-) chlorinated toluenes, ring-chlorinated toluenes, benzoyl chlorides, and compounds with mixtures of these functional groups.	(T)
K156	Organic waste (including heavy ends, still bottoms, light ends, spent solvents, filtrates, and decantates) from the production of carbamates and carbamoyl oximes. (This listing does not apply to wastes generated from the manufacture of 3-iodo-2-propynyl n-butylcarbamate.).	(T)
K157	Wastewaters (including scrubber waters, condenser waters, washwaters, and separation waters) from the production of carbamates and carbamoyl oximes. (This listing does not apply to wastes generated from the manufacture of 3-iodo-2-propynyl n-butylcarbamate.).	(T)
K158	Bag house dusts and filter/separation solids from the production of carbamates and carbamoyl oximes. (This listing does not apply to wastes generated from the manufacture of 3-iodo-2-propynyl n-butylcarbamate.).	(T)
K159	Organics from the treatment of thiocarbamate wastes	(T)
K161	Purification solids (including filtration, evaporation, and centrifugation solids), bag house dust and floor sweepings from the production of dithiocarbamate acids and their salts. (This listing does not include K125 or K126).	(R,T)

Industry and EPA hazardous waste No.	Hazardous waste	Hazard code
K174	Wastewater treatment sludges from the production of ethylene dichloride or vinyl chloride monomer (including sludges that result from commingled ethylene dichloride or vinyl chloride monomer wastewater and other wastewater), unless the sludges meet the following conditions: (i) they are disposed of in a subtitle C or non-hazardous landfill licensed or permitted by the state or federal government; (ii) they are not otherwise placed on the land prior to final disposal; and (iii) the generator maintains documentation demonstrating that the waste was either disposed of in an on-site landfill or consigned to a transporter or disposal facility that provided a written commitment to dispose of the waste in an off-site landfill. Respondents in any action brought to enforce the requirements of subtitle C must, upon a showing by the government that the respondent managed wastewater treatment sludges from the production of vinyl chloride monomer or ethylene dichloride, demonstrate that they meet the terms of the exclusion set forth above. In doing so, they must provide appropriate documentation (e.g., contracts between the generator and the landfill owner/operator, invoices documenting delivery of waste to landfill, etc.) that the terms of the exclusion were met.	(T)
K175	Wastewater treatment sludges from the production of vinyl chloride monomer using mercuric chloride catalyst in an acetylene-based process.	(T)
Inorganic chemicals:		
K071	Brine purification muds from the mercury cell process in chlorine production, where separately prepurified brine is not used.	(T)
K073	Chlorinated hydrocarbon waste from the purification step of the diaphragm cell process using graphite anodes in chlorine production.	(T)
K106	Wastewater treatment sludge from the mercury cell process in chlorine production.	(T)
K176	Baghouse filters from the production of antimony oxide, including filters from the production of intermediates (e.g., antimony metal or crude antimony oxide).	(E)
K177	Slag from the production of antimony oxide that is speculatively accumulated or disposed, including slag from the production of intermediates (e.g., antimony metal or crude antimony oxide).	(T)
K178	Residues from manufacturing and manufacturing-site storage of ferric chloride from acids formed during the production of titanium dioxide using the chloride-ilmenite process.	(T)
Pesticides:		
K031	By-product salts generated in the production of MSMA and cacodylic acid.	(T)
K032	Wastewater treatment sludge from the production of chlordane.	(T)
K033	Wastewater and scrub water from the chlorination of cyclopentadiene in the production of chlordane.	(T)
K034	Filter solids from the filtration of hexachlorocyclopentadiene in the production of chlordane.	(T)
K035	Wastewater treatment sludges generated in the production of creosote.	(T)
K036	Still bottoms from toluene reclamation distillation in the production of disulfoton.	(T)
K037	Wastewater treatment sludges from the production of disulfoton.	(T)
K038	Wastewater from the washing and stripping of phorate production.	(T)

Industry and EPA hazardous waste No.	Hazardous waste	Hazard code
K039	Filter cake from the filtration of diethylphosphorodithioic acid in the production of phorate.	(T)
K040	Wastewater treatment sludge from the production of phorate.	(T)
K041	Wastewater treatment sludge from the production of toxaphene.	(T)
K042	Heavy ends or distillation residues from the distillation of tetrachlorobenzene in the production of 2,4,5-T.	(T)
K043	2,6-Dichlorophenol waste from the production of 2,4-D.	(T)
K097	Vacuum stripper discharge from the chlordane chlorinator in the production of chlordane.	(T)
K098	Untreated process wastewater from the production of toxaphene.	(T)
K099	Untreated wastewater from the production of 2,4-D.	(T)
K123	Process wastewater (including supernates, filtrates, and washwaters) from the production of ethylenebisdithiocarbamic acid and its salt.	(T)
K124	Reactor vent scrubber water from the production of ethylenebisdithiocarbamic acid and its salts.	(C, T)
K125	Filtration, evaporation, and centrifugation solids from the production of ethylenebisdithiocarbamic acid and its salts.	(T)
K126	Baghouse dust and floor sweepings in milling and packaging operations from the production or formulation of ethylenebisdithiocarbamic acid and its salts.	(T)
K131	Wastewater from the reactor and spent sulfuric acid from the acid dryer from the production of methyl bromide.	(C,T)
K132	Spent absorbent and wastewater separator solids from the production of methyl bromide.	(T)
Explosives:		
K044	Wastewater treatment sludges from the manufacturing and processing of explosives.	(R)
K045	Spent carbon from the treatment of wastewater containing explosives.	(R)
K046	Wastewater treatment sludges from the manufacturing, formulation and loading of lead-based initiating compounds.	(T)
K047	Pink/red water from TNT operations.	(R)
Petroleum refining:		
K048	Dissolved air flotation (DAF) float from the petroleum refining industry.	(T)
K049	Slop oil emulsion solids from the petroleum refining industry.	(T)
K050	Heat exchanger bundle cleaning sludge from the petroleum refining industry.	(T)
K051	API separator sludge from the petroleum refining industry.	(T)
K052	Tank bottoms (leaded) from the petroleum refining industry.	(T)
K169	Crude oil storage tank sediment from petroleum refining operations	(T)
K170	Clarified slurry oil tank sediment and/or in-line filter/separation solids from petroleum refining operations.	(T)

Industry and EPA hazardous waste No.	Hazardous waste	Hazard code
K171	Spent Hydrotreating catalyst from petroleum refining operations, including guard beds used to desulfurize feeds to other catalytic reactors (this listing does not include inert support media).	(I,T)
K172	Spent Hydrorefining catalyst from petroleum refining operations, including guard beds used to desulfurize feeds to other catalytic reactors (this listing does not include inert support media).	(I,T)
Iron and steel:		
K061	Emission control dust/sludge from the primary production of steel in electric furnaces.	(T)
K062	Spent pickle liquor generated by steel finishing operations of facilities within the iron and steel industry (SIC Codes 331 and 332).	(C,T)
Primary aluminum:		
K088	Spent potliners from primary aluminum reduction.	(T)
Secondary lead:		
K069	Emission control dust/sludge from secondary lead smelting. (Note: This listing is stayed administratively for sludge generated from secondary acid scrubber systems. The stay will remain in effect until further administrative action is taken. If EPA takes further action affecting this stay, the Hazardous Waste Commission will publish a notice of the action in the Colorado Register).	(T)
K100	Waste leaching solution from acid leaching of emission control dust/sludge from secondary lead smelting.	(T)
Veterinary pharmaceu-ticals:		
K084	Wastewater treatment sludges generated during the production of veterinary pharmaceuticals from arsenic or organo-arsenic compounds.	(T)
K101	Distillation tar residues from the distillation of aniline-based compounds in the production of veterinary pharmaceuticals from arsenic or organo-arsenic compounds.	(T)
K102	Residue from the use of activated carbon for decolorization in the production of veterinary pharmaceuticals from arsenic or organo-arsenic compounds.	(T)
Ink formulation:		
K086	Solvent washes and sludges, caustic washes and sludges, or water washes and sludges from cleaning tubs and equipment used in the formulation of ink from pigments, driers, soaps, and stabilizers containing chromium and lead.	(T)
Coking:		
K060	Ammonia still lime sludge from coking operations.	(T)
K087	Decanter tank tar sludge from coking operations.	(T)
K141	Process residues from the recovery of coal tar, including, but not limited to, collecting sump residues from the production of coke from coal or the recovery of coke by-products produced from coal. This listing does not include K087 (decanter tank tar sludges from coking operations).	(T)

Industry and EPA hazardous waste No.	Hazardous waste	Hazard code
K142	Tar storage tank residues from the production of coke from coal or from the recovery of coke by-products produced from coal.	(T)
K143	Process residues from the recovery of light oil, including, but not limited to, those generated in stills, decanters, and wash oil recovery units from the recovery of coke by-products produced from coal.	(T)
K144	Wastewater sump residues from light oil refining, including, but not limited to, intercepting or contamination sump sludges from the recovery of coke by-products produced from coal.	(T)
K145	Residues from naphthalene collection and recovery operations from the recovery of coke by-products produced from coal.	(T)
K147	Tar storage tank residues from coal tar refining.	(T)
K148	Residues from coal tar distillation, including but not limited to, still bottoms.	(T)
Military Munitions:		
K901	Waste chemical weapons using or containing any chemical compound identified in Appendix VII of Part 261 as the basis for this listing. Residues resulting from treatment of hazardous wastes with the codes P909, P910 and P911 are included in this listing.	(H)
K902	Any soil, water, debris, or containers contaminated through contact with waste chemical weapons listed as K901 or hazardous wastes listed as P909, P910 or P911.	(H)

APPENDIX C § 261.33(e) Discarded commercial chemical products, off-specification species, container residues and spill residues thereof

Hazardous waste No.	Chemical abstracts No.	Substance	Common Name
P023	107-20-0	Acetaldehyde, chloro-	Chloroacetaldehyde
P002	591-08-2	Acetamide, N-(aminothioxomethyl)-	1-Acetyl-2-thiourea
P057	640-19-7	Acetamide, 2-fluoro-	Fluoroacetamide
P058	62-74-8	Acetic acid, fluoro-, sodium salt	Fluoroacetic acid, sodium salt
P002	591-08-2	1-Acetyl-2-thiourea	Same
P003	107-02-8	Acrolein	Same
P070	116-06-3	Aldicarb	Same
P203	1646-88-4	Aldicarb sulfone	Same
P004	309-00-2	Aldrin	Same
P005	107-18-6	Allyl alcohol	Same
P006	20859-73-8	Aluminum phosphide (R,T)	Same
P007	2763-96-4	5-(Aminomethyl)-3-isoxazolol	Muscimol
P008	504-24-5	4-Aminopyridine	Same
P009	131-74-8	Ammonium picrate (R)	Same
P119	7803-55-6	Ammonium vanadate	Ammonium metavanadate
P099	506-61-6	Argentate(1-), bis(cyano-C)-, potassium	Potassium silver cyanide
P010	7778-39-4	Arsenic acid H_3AsO_4	Arsenic acid
P012	1327-53-3	Arsenic oxide As_2O_3	Arsenic trioxide
P011	1303-28-2	Arsenic oxide As_2O_5	Arsenic pentoxide
P011	1303-28-2	Arsenic pentoxide	Same
P012	1327-53-3	Arsenic trioxide	Same
P038	692-42-2	Arsine, diethyl-	Diethylarsine
P036	696-28-6	Arsonous dichloride, phenyl-	Dichlorophenylarsine
P054	151-56-4	Aziridine	Ethyleneimine
P067	75-55-8	Aziridine, 2-methyl-	Propyleneimine
P013	542-62-1	Barium cyanide	Same
P024	106-47-8	Benzenamine, 4-chloro-	4-Chloroaniline
P077	100-01-6	Benzenamine, 4-nitro-	4-Nitroaniline
P028	100-44-7	Benzene, (chloromethyl)-	Benzyl chloride
P042	51-43-4	1,2-Benzenediol, 4-[1-hydroxy-2-(methylamino)ethyl]-, (R)-	Epinephrine
P046	122-09-8	Benzeneethanamine, alpha,alpha-dimethyl-	Phentermine

Hazardous waste No.	Chemical abstracts No.	Substance	Common Name
P014	108-98-5	Benzenethiol	Thiophenol
P127	1563-66-2	7-Benzofuranol, 2,3-dihydro-2,2-dimethyl-,methylcarbamate	Carbofuran
P188	57-64-7	Benzoic acid, 2-hydroxy-, compd. with (3aS-cis)-1,2,3,3a,8,8a-hexahydro-1, 3a,8-trimethylpyrrolo[2,3-b]indol-5-yl methylcarbamate ester (1:1)	Physostigmine, salicylate
P001	[1]81-81-2	2H-1-Benzopyran-2-one, 4-hydroxy-3-(3-oxo-1-phenylbutyl)-, & salts, when present at concentrations greater than 0.3%	Warfarin salts, when present at concentrations greater than 0.3%
P028	100-44-7	Benzyl chloride	Same
P015	7440-41-7	Beryllium powder	Same
P017	598-31-2	Bromoacetone	Same
P018	357-57-3	Brucine	Same
P045	39196-18-4	2-Butanone, 3,3-dimethyl-1-(methylthio)-, O-[methylamino)carbonyl] oxime	Thiofanox
P021	592-01-8	Calcium cyanide	Same
P021	592-01-8	Calcium cyanide $Ca(CN)_2$	Calcium cyanide
P189	55285-14-8	Carbamic acid, [(dibutylamino)- thio]methyl-, 2,3-dihydro-2,2-dimethyl-7-benzofuranyl ester	Carbosulfan
P191	644-64-4	Carbamic acid, dimethyl-, 1-[(dimethyl-amino)carbonyl]- 5-methyl-1H-pyrazol-3-yl ester	Dimetilan
P192	119-38-0	Carbamic acid, dimethyl-, 3-methyl-1- (1-methylethyl)-1H- pyrazol-5-yl ester	Isolan
P190	1129-41-5	Carbamic acid, methyl-, 3-methylphenyl ester	Metolcarb
P127	1563-66-2	Carbofuran	Same
P022	75-15-0	Carbon disulfide	Same
P095	75-44-5	Carbonic dichloride	Phosgene
P189	55285-14-8	Carbosulfan	Same
P023	107-20-0	Chloroacetaldehyde	Same
P024	106-47-8	p-Chloroaniline	4-Chloroaniline
P026	5344-82-1	1-(o-Chlorophenyl)thiourea	2-Chlorophenylthiourea
P027	542-76-7	3-Chloropropionitrile	Same
P029	544-92-3	Copper cyanide	Same
P029	544-92-3	Copper cyanide Cu(CN)	Copper cyanide
P202	64-00-6	m-Cumenyl methylcarbamate	Phenol, 3(1-methylethyl)-, methylcarbamate

Hazardous waste No.	Chemical abstracts No.	Substance	Common Name
P030	57-12-5	Cyanides (soluble cyanide salts), not otherwise specified	Same
P031	460-19-5	Cyanogen	Same
P033	506-77-4	Cyanogen chloride	Same
P033	506-77-4	Cyanogen chloride (CN)Cl	Cyanogen chloride
P034	131-89-5	2-Cyclohexyl-4,6-dinitrophenol	2,4-Dinitro-6-cyclohexylphenol
P016	542-88-1	Dichloromethyl ether	Bis(chloromethyl) ether
P036	696-28-6	Dichlorophenylarsine	Same
P037	60-57-1	Dieldrin	Same
P038	692-42-2	Diethylarsine	Same
P041	311-45-5	Diethyl-p-nitrophenyl phosphate	Paraoxon
P040	297-97-2	O,O-Diethyl O-pyrazinyl phosphorothioate	Thionazin
P043	55-91-4	Diisopropylfluorophosphate (DFP)	Same
P004	309-00-2	1,4,5,8-Dimethanonaphthalene, 1,2,3,4,10,10-hexa- chloro-1,4,4a,5,8,8a,-hexahydro-, (1alpha,4alpha,4abeta,5alpha,8alpha,8abeta)-	Aldrin
P060	465-73-6	1,4,5,8-Dimethanonaphthalene, 1,2,3,4,10,10-hexa- chloro-1,4,4a,5,8,8a-hexahydro-, (1alpha,4alpha,4abeta,5beta,8beta,8abeta)-	Isodrin
P037	60-57-1	2,7:3,6-Dimethanonaphth[2,3-b]oxirene, 3,4,5,6,9,9-hexachloro-1a,2,2a,3,6,6a,7,7a-octahydro-, (1aalpha,2beta,2aalpha,3beta,6beta,6aalpha,7 beta, 7aalpha)-	Dieldrin
P051	[1]72-20-8	2,7:3,6-Dimethanonaphth [2,3-b]oxirene, 3,4,5,6,9,9-hexachloro-1a,2,2a,3,6,6a,7,7a-octahydro-, (1aalpha,2beta,2abeta,3alpha,6alpha,6abeta,7 beta, 7aalpha)-, & metabolites	Endrin
P044	60-51-5	Dimethoate	Same
P046	122-09-8	alpha,alpha-Dimethylphenethylamine	Phentermine
P191	644-64-4	Dimetilan	Same
P047	[1]534-52-1	4,6-Dinitro-o-cresol, & salts	Same
P048	51-28-5	2,4-Dinitrophenol	Same
P020	88-85-7	Dinoseb	Same
P085	152-16-9	Diphosphoramide, octamethyl-	Schradan
P111	107-49-3	Diphosphoric acid, tetraethyl ester	Tetraethyl pyrophosphate
P039	298-04-4	Disulfoton	Same
P049	541-53-7	Dithiobiuret	2,4-Dithiobiuret

Hazardous waste No.	Chemical abstracts No.	Substance	Common Name
P185	26419-73-8	1,3-Dithiolane-2-carboxaldehyde, 2,4-dimethyl-, O-[(methylamino)-carbonyl]oxime	Tirpate
P050	115-29-7	Endosulfan	Same
P088	145-73-3	Endothall	Same
P051	72-20-8	Endrin	Same
P051	72-20-8	Endrin, & metabolites	Same
P042	51-43-4	Epinephrine	Same
P031	460-19-5	Ethanedinitrile	Cyanogen
P066	16752-77-5	Ethanimidothioic acid, N-[[(methylamino)carbonyl]oxy]-, methyl ester	Methomyl
P194	23135-22-0	Ethanimidothioic acid, 2-(dimethylamino)-N-[[(methylamino) carbonyl]oxy]-2-oxo-, methyl ester.	Oxamyl
P101	107-12-0	Ethyl cyanide	Propionitrile
P054	151-56-4	Ethyleneimine	Same
P097	52-85-7	Famphur	Same
P056	7782-41-4	Fluorine	Same
P057	640-19-7	Fluoroacetamide	Same
P058	62-74-8	Fluoroacetic acid, sodium salt	Sodium fluoroacetate
P198	23422-53-9	Formetanate hydrochloride	Same
P197	17702-57-7	Formparanate	Same
P065	628-86-4	Fulminic acid, mercury(2+) salt (R,T)	Mercury fulminate
P059	76-44-8	Heptachlor	Same
P062	757-58-4	Hexaethyl tetraphosphate	Same
P116	79-19-6	Hydrazinecarbothioamide	1-Amino-2-thiourea
P068	60-34-4	Hydrazine, methyl-	Methyl hydrazine
P063	74-90-8	Hydrocyanic acid	Hydrogen cyanide
P063	74-90-8	Hydrogen cyanide	Same
P096	7803-51-2	Hydrogen phosphide	Phosphine
P060	465-73-6	Isodrin	Same
P192	119-38-0	Isolan	Same
P202	64-00-6	3-Isopropylphenyl N-methylcarbamate	m-Cumenyl methylcarbamate
P007	2763-96-4	3(2H)-Isoxazolone, 5-(aminomethyl)-	Muscimol
P196	15339-36-3	Manganese, bis(dimethylcarbamodithioato-S,S')-	Manganese dimethyldithiocarbamate

Hazardous waste No.	Chemical abstracts No.	Substance	Common Name
P196	15339-36-3	Manganese dimethyldithiocarbamate	Same
P092	62-38-4	Mercury, (acetato-O)phenyl-	Phenylmercury acetate
P065	628-86-4	Mercury fulminate (R,T)	Same
P082	62-75-9	Methanamine, N-methyl-N-nitroso-	N-Nitrosodimethylamine
P064	624-83-9	Methane, isocyanato-	Methyl isocyanate
P016	542-88-1	Methane, oxybis[chloro-	Bis(chloromethyl) ether
P112	509-14-8	Methane, tetranitro- (R)	Tetranitromethane
P118	75-70-7	Methanethiol, trichloro-	Trichloromethyl mercaptan
P198	23422-53-9	Methanimidamide, N,N-dimethyl-N'-[3-[[(methylamino)-carbonyl] oxy]phenyl]-, monohydrochloride	Formetanate hydrochloride
P197	17702-57-7	Methanimidamide, N,N-dimethyl-N'-[2-methyl-4-[[(methylamino)carbonyl] oxy]phenyl]-	Formparanate
P050	115-29-7	6,9-Methano-2,4,3-benzodioxathiepin, 6,7,8,9,10,10- hexachloro-1,5,5a,6,9,9a-hexahydro-, 3-oxide	Endosulfan
P059	76-44-8	4,7-Methano-1H-indene, 1,4,5,6,7,8,8-heptachloro- 3a,4,7,7a-tetrahydro-	Heptachlor
P199	2032-65-7	Methiocarb	Same
P066	16752-77-5	Methomyl	Same
P068	60-34-4	Methyl hydrazine	Same
P064	624-83-9	Methyl isocyanate	Same
P069	75-86-5	2-Methyllactonitrile	Acetone cyanohydrin
P071	298-00-0	Methyl parathion	Same
P190	1129-41-5	Metolcarb	Same
P128	315-18-4	Mexacarbate	Same
P072	86-88-4	alpha-Naphthylthiourea	Same
P073	13463-39-3	Nickel carbonyl	Same
P073	13463-39-3	Nickel carbonyl $Ni(CO)_4$, (T-4)-	Nickel carbonyl
P074	557-19-7	Nickel cyanide	Same
P074	557-19-7	Nickel cyanide $Ni(CN)_2$	Nickel cyanide
P075	[1]54-11-5	Nicotine, & salts	Same
P076	10102-43-9	Nitric oxide	Same
P077	100-01-6	p-Nitroaniline	Same
P078	10102-44-0	Nitrogen dioxide	Same

Hazardous waste No.	Chemical abstracts No.	Substance	Common Name
P076	10102-43-9	Nitrogen oxide NO	Nitric Oxide
P078	10102-44-0	Nitrogen oxide NO_2	Nitrogen dioxide
P081	55-63-0	Nitroglycerine (R)	Nitroglycerin
P082	62-75-9	N-Nitrosodimethylamine	Same
P084	4549-40-0	N-Nitrosomethylvinylamine	Same
P085	152-16-9	Octamethylpyrophosphoramide	Schradan
P087	20816-12-0	Osmium oxide OsO_4, (T-4)-	Osmium tetroxide
P087	20816-12-0	Osmium tetroxide	Same
P088	145-73-3	7-Oxabicyclo[2.2.1]heptane-2,3-dicarboxylic acid	Endothall
P194	23135-22-0	Oxamyl	Same
P089	56-38-2	Parathion	Same
P034	131-89-5	Phenol, 2-cyclohexyl-4,6-dinitro-	2,4-Dinitro-6-cyclohexylphenol
P128	315-18-4	Phenol, 4-(dimethylamino)-3,5-dimethyl-, methylcarbamate (ester)	Mexacarbate
P199	2032-65-7	Phenol, (3,5-dimethyl-4-(methylthio)-, methylcarbamate	Methiocarb
P048	51-28-5	Phenol, 2,4-dinitro-	2,4-Dinitrophenol
P047	[1]534-52-1	Phenol, 2-methyl-4,6-dinitro-, & salts	4,6-Dinitro-o-cresol, & salts
P202	64-00-6	Phenol, 3-(1-methylethyl)-, methyl carbamate	m-Cumenyl methylcarbamate
P201	2631-37-0	Phenol, 3-methyl-5-(1-methylethyl)-, methyl carbamate	Promecarb
P020	88-85-7	Phenol, 2-(1-methylpropyl)-4,6-dinitro-	Dinoseb
P009	131-74-8	Phenol, 2,4,6-trinitro-, ammonium salt (R)	Ammonium picrate
P092	62-38-4	Phenylmercury acetate	Same
P093	103-85-5	Phenylthiourea	Same
P094	298-02-2	Phorate	Same
P095	75-44-5	Phosgene	Same
P096	7803-51-2	Phosphine	Same
P041	311-45-5	Phosphoric acid, diethyl 4-nitrophenyl ester	Paraoxon
P039	298-04-4	Phosphorodithioic acid, O,O-diethyl S-[2-(ethylthio)ethyl] ester	Disulfoton
P094	298-02-2	Phosphorodithioic acid, O,O-diethyl S-[(ethylthio)methyl] ester	Phorate
P044	60-51-5	Phosphorodithioic acid, O,O-dimethyl S-[2-(methylamino)-2-oxoethyl] ester	Dimethoate

Hazardous waste No.	Chemical abstracts No.	Substance	Common Name
P043	55-91-4	Phosphorofluoridic acid, bis(1-methylethyl) ester	Diisopropylfluorophosphate (DFP)
P089	56-38-2	Phosphorothioic acid, O,O-diethyl O-(4-nitrophenyl) ester	Parathion
P040	297-97-2	Phosphorothioic acid, O,O-diethyl O-pyrazinyl ester	Thionazin
P097	52-85-7	Phosphorothioic acid, O-[4-[(dimethylamino)sulfonyl]phenyl] O,O-dimethyl ester	Famphur
P071	298-00-0	Phosphorothioic acid, O,O,-dimethyl O-(4-nitrophenyl) ester	Methyl parathion
P204	57-47-6	Physostigmine	Same
P188	57-64-7	Physostigmine salicylate	Same
P110	78-00-2	Plumbane, tetraethyl-	Tetraethyl lead
P098	151-50-8	Potassium cyanide	Same
P098	151-50-8	Potassium cyanide K(CN)	Potassium cyanide
P099	506-61-6	Potassium silver cyanide	Same
P201	2631-37-0	Promecarb	Same
P203	1646-88-4	Propanal, 2-methyl-2-(methyl-sulfonyl)-, O-[(methylamino) carbonyl] oxime	Aldicarb sulfone
P070	116-06-3	Propanal, 2-methyl-2-(methylthio)-, O-[(methylamino)carbonyl]oxime	Aldicarb
P101	107-12-0	Propanenitrile	Propionitrile
P027	542-76-7	Propanenitrile, 3-chloro-	3-Chloropropionitrile
P069	75-86-5	Propanenitrile, 2-hydroxy-2-methyl-	Acetone cyanohydrin
P081	55-63-0	1,2,3-Propanetriol, trinitrate (R)	Nitroglycerin
P017	598-31-2	2-Propanone, 1-bromo-	Bromoacetone
P102	107-19-7	Propargyl alcohol	Same
P003	107-02-8	2-Propenal	Acrolein
P005	107-18-6	2-Propen-1-ol	Allyl alcohol
P067	75-55-8	1,2-Propylenimine	Same
P102	107-19-7	2-Propyn-1-ol	Propargyl alcohol
P008	504-24-5	4-Pyridinamine	4-aminopyridine
P075	[1]54-11-5	Pyridine, 3-(1-methyl-2-pyrrolidinyl)-, (S)-, & salts	Nicotine, & Nicotine salts
P204	57-47-6	Pyrrolo[2,3-b]indol-5-ol, 1,2,3,3a,8,8a-hexahydro-1,3a,8-trimethyl-, methylcarbamate (ester), (3aS-cis)-	Physostigmine

Hazardous waste No.	Chemical abstracts No.	Substance	Common Name
P114	12039-52-0	Selenious acid, dithallium(1+) salt	Thallium selenide
P103	630-10-4	Selenourea	Same
P104	506-64-9	Silver cyanide	Same
P104	506-64-9	Silver cyanide Ag(CN)	Silver cyanide
P105	26628-22-8	Sodium azide	Same
P106	143-33-9	Sodium cyanide	Same
P106	143-33-9	Sodium cyanide Na(CN)	Sodium cyanide
P108	[1]57-24-9	Strychnidin-10-one, & salts	Strychnine, & salts
P018	357-57-3	Strychnidin-10-one, 2,3-dimethoxy-	Brucine
P108	[1]57-24-9	Strychnine, & salts	Same
P115	7446-18-6	Sulfuric acid, dithallium(1+) salt	Thallous sulfate
P109	3689-24-5	Tetraethyldithiopyrophosphate	Dithion
P110	78-00-2	Tetraethyl lead	Same
P111	107-49-3	Tetraethyl pyrophosphate	Same
P112	509-14-8	Tetranitromethane (R)	Same
P062	757-58-4	Tetraphosphoric acid, hexaethyl ester	Hexaethyl tetraphosphate
P113	1314-32-5	Thallic oxide	Same
P113	1314-32-5	Thallium oxide Tl_2O_3	Thallic oxide
P114	12039-52-0	Thallium(I) selenite	Thallium selenide
P115	7446-18-6	Thallium(I) sulfate	Same
P109	3689-24-5	Thiodiphosphoric acid, tetraethyl ester	Dithion
P045	39196-18-4	Thiofanox	Same
P049	541-53-7	Thioimidodicarbonic diamide $[(H_2N)C(S)]_2NH$	2,4-Dithiobiuret
P014	108-98-5	Thiophenol	Same
P116	79-19-6	Thiosemicarbazide	1-amino-2-thiourea
P026	5344-82-1	Thiourea, (2-chlorophenyl)-	N-(2-Chlorophenyl)thiourea
P072	86-88-4	Thiourea, 1-naphthalenyl-	alpha-Naphthylthiourea
P093	103-85-5	Thiourea, phenyl-	1-Phenyl-2-thiourea
P185	26419-73-8	Tirpate	Same
P123	8001-35-2	Toxaphene	Same
P118	75-70-7	Trichloromethanethiol	Trichloromethyl mercaptan
P119	7803-55-6	Vanadic acid, ammonium salt	Ammonium metavanadate

Hazardous waste No.	Chemical abstracts No.	Substance	Common Name
P120	1314-62-1	Vanadium oxide V_2O_5	Vanadium pentoxide
P120	1314-62-1	Vanadium pentoxide	Same
P084	4549-40-0	Vinylamine, N-methyl-N-nitroso-	N-Nitrosomethylvinylamine
P001	[1]81-81-2	Warfarin, & salts, when present at concentrations greater than 0.3%	Same
P205	137-30-4	Zinc, bis(dimethylcarbamodithioato-S,S')-	Ziram
P121	557-21-1	Zinc cyanide	Same
P121	557-21-1	Zinc cyanide $Zn(CN)_2$	Zinc cyanide
P122	1314-84-7	Zinc phosphide Zn_3P_2, when present at concentrations greater than 10% (R,T)	Same
P205	137-30-4	Ziram	Same
P909[2]	505-60-2	bis(2-chloroethyl)sulfide (Residues resulting from treatment of this waste are included in the K901 listing and do not carry the P909 code. Soils, water, debris, or containers contaminated with this waste are included in the K902 listing and do not carry the P909 code.)	Mustard, Mustard Agent, Mustard Gas, H, HD
P910[2]	505-60-2, 63918-89-8	bis(2-chloroethyl)sulfide and bis (2-chloroethylthio)ethyl ether (Residues resulting from treatment of this waste are included in the K901 listing and do not carry the P910 code. Soils, water, debris, or containers contaminated with this waste are included in the K902 listing and do not carry the P910 code.)	Mustard, Mustard Agent, Mustard Gas, HT, Mustard T
P911	107-44-8	0-isopropyl methylphosphonofluoridate (Residues resulting from treatment of this waste are included in the K901 listing and do not carry the P911 code. Soils, water, debris, or containers contaminated with this waste are included in the K902 listing and do not carry the P911 code.)	GB, Sarin

FOOTNOTE: [1]CAS Number given for parent compound only.

[2] H- Mustard made by the Levinstein process; typically has 25% impurities.
HD- Distilled mustard containing 5% impurities.
HT- 60:40 mixture of HD and T.
T- bis(2-chloroethylthio)ethyl ether.

APPENDIX D § 261.33(f) Discarded commercial chemical products, off-specification species, container residues, and spill residues thereof

Hazardous waste No.	Chemical abstracts No.	Substance	Common Name
U394	30558-43-1	A2213	Same
U001	75-07-0	Acetaldehyde (I)	Same
U034	75-87-6	Acetaldehyde, trichloro-	Chloral
U187	62-44-2	Acetamide, N-(4-ethoxyphenyl)-	Phenacetin
U005	53-96-3	Acetamide, N-9H-fluoren-2-yl-	2-Acetylaminofluorene
U240	[1]94-75-7	Acetic acid, (2,4-dichlorophenoxy)-, salts & esters	2,4-D
U112	141-78-6	Acetic acid ethyl ester (I)	Ethyl acetate
U144	301-04-2	Acetic acid, lead(2+) salt	Lead acetate
U214	563-68-8	Acetic acid, thallium(1+) salt	Thallium (I) acetate
see F027	93-76-5	Acetic acid, (2,4,5-trichlorophenoxy)-	2,4,5-T
U002	67-64-1	Acetone (I)	Same
U003	75-05-8	Acetonitrile (I,T)	Same
U004	98-86-2	Acetophenone	Same
U005	53-96-3	2-Acetylaminofluorene	Same
U006	75-36-5	Acetyl chloride (C,R,T)	Same
U007	79-06-1	Acrylamide	Same
U008	79-10-7	Acrylic acid (I)	Same
U009	107-13-1	Acrylonitrile	Same
U011	61-82-5	Amitrole	Same
U012	62-53-3	Aniline (I,T)	Same
U136	75-60-5	Arsinic acid, dimethyl-	Dimethylarsenic acid
U014	492-80-8	Auramine	Same
U015	115-02-6	Azaserine	Same
U010	50-07-7	Azirino[2',3':3,4]pyrrolo[1,2-a]indole-4,7-dione, 6-amino-8-[[(aminocarbonyl)oxy]methyl]-1,1a,2,8,8a,8b-hexahydro-8a-methoxy-5-methyl-, [1aS-(1aalpha, 8beta,8aalpha,8balpha)]-	Mitomycin C
U280	101-27-9	Barban	Same
U278	22781-23-3	Bendiocarb	Same
U364	22961-82-6	Bendiocarb phenol	Same
U271	17804-35-2	Benomyl	Same
U157	56-49-5	Benz[j]aceanthrylene, 1,2-dihydro-3-methyl-	3-Methylcholanthrene
U016	225-51-4	Benz[c]acridine	Same

Hazardous waste No.	Chemical abstracts No.	Substance	Common Name
U017	98-87-3	Benzal chloride	Same
U192	23950-58-5	Benzamide, 3,5-dichloro-N-(1,1-dimethyl-2-propynyl)-	Pronamide
U018	56-55-3	Benz[a]anthracene	Same
U094	57-97-6	Benz[a]anthracene, 7,12-dimethyl-	7,12-Dimethylbenz[a]anthracene
U012	62-53-3	Benzenamine (I,T)	Aniline
U014	492-80-8	Benzenamine, 4,4'-carbonimidoylbis[N,N-dimethyl-	Auramine
U049	3165-93-3	Benzenamine, 4-chloro-2-methyl-, hydrochloride	4-Chloro-o-toluidine hydrochloride
U093	60-11-7	Benzenamine, N,N-dimethyl-4-(phenylazo)-	4-(Dimethylamino)azobenzene
U328	95-53-4	Benzenamine, 2-methyl-	2-aminotoluene
U353	106-49-0	Benzenamine, 4-methyl-	4-aminotoluene
U158	101-14-4	Benzenamine, 4,4'-methylenebis[2-chloro-	4,4'-Methylenebis(2-chloroaniline)
U222	636-21-5	Benzenamine, 2-methyl-, hydrochloride	2-Methylaniline hydrochloride
U181	99-55-8	Benzenamine, 2-methyl-5-nitro-	5-Nitro-o-toluidine
U019	71-43-2	Benzene (I,T)	Same
U038	510-15-6	Benzeneacetic acid, 4-chloro-alpha-(4-chlorophenyl)-alpha-hydroxy-, ethyl ester	Chlorobenzilate
U030	101-55-3	Benzene, 1-bromo-4-phenoxy-	4-Bromophenyl phenyl ether
U035	305-03-3	Benzenebutanoic acid, 4-[bis(2-chloroethyl)amino]-	Chlorambucil
U037	108-90-7	Benzene, chloro-	Chlorobenzene
U221	25376-45-8	Benzenediamine, ar-methyl-	Toluenediamine
U028	117-81-7	1,2-Benzenedicarboxylic acid, bis(2-ethylhexyl) ester	Diethylhexyl phthalate
U069	84-74-2	1,2-Benzenedicarboxylic acid, dibutyl ester	Dibutyl phthalate
U088	84-66-2	1,2-Benzenedicarboxylic acid, diethyl ester	Diethyl phthalate
U102	131-11-3	1,2-Benzenedicarboxylic acid, dimethyl ester	Dimethyl phthalate
U107	117-84-0	1,2-Benzenedicarboxylic acid, dioctyl ester	Di-n-octyl phthalate
U070	95-50-1	Benzene, 1,2-dichloro-	1,2-Dichlorobenzene
U071	541-73-1	Benzene, 1,3-dichloro-	1,3-Dichlorobenzene
U072	106-46-7	Benzene, 1,4-dichloro-	1,4-Dichlorobenzene
U060	72-54-8	Benzene, 1,1'-(2,2-dichloroethylidene)bis[4-chloro-	DDD

Hazardous waste No.	Chemical abstracts No.	Substance	Common Name
U017	98-87-3	Benzene, (dichloromethyl)-	Benzal chloride
U223	26471-62-5	Benzene, 1,3-diisocyanatomethyl- (R,T)	Toluene diisocyanate
U239	1330-20-7	Benzene, dimethyl- (I,T)	Xylene
U201	108-46-3	1,3-Benzenediol	Resorcinol
U127	118-74-1	Benzene, hexachloro-	Hexachlorobenzene
U056	110-82-7	Benzene, hexahydro- (I)	Cyclohexane
U220	108-88-3	Benzene, methyl-	Toluene
U105	121-14-2	Benzene, 1-methyl-2,4-dinitro-	2,4-Dinitrotoluene
U106	606-20-2	Benzene, 2-methyl-1,3-dinitro-	2,6-Dinitrotoluene
U055	98-82-8	Benzene, (1-methylethyl)- (I)	Cumene
U169	98-95-3	Benzene, nitro-	Nitrobenzene
U183	608-93-5	Benzene, pentachloro-	Pentachlorobenzene
U185	82-68-8	Benzene, pentachloronitro-	Pentachloronitrobenzene (PCNB)
U020	98-09-9	Benzenesulfonic acid chloride (C,R)	Benzenesulfonyl chloride
U020	98-09-9	Benzenesulfonyl chloride (C,R)	Same
U207	95-94-3	Benzene, 1,2,4,5-tetrachloro-	1,2,4,5-Tetrachlorobenzene
U061	50-29-3	Benzene, 1,1'-(2,2,2-trichloroethylidene)bis[4-chloro-	DDT
U247	72-43-5	Benzene, 1,1'-(2,2,2-trichloroethylidene)bis[4- methoxy-	Methoxychlor
U023	98-07-7	Benzene, (trichloromethyl)-	Benzotrichloride
U234	99-35-4	Benzene, 1,3,5-trinitro-	1,3,5-Trinitrobenzene
U021	92-87-5	Benzidine	Same
U202	[1]81-07-2	1,2-Benzisothiazol-3(2H)-one, 1,1-dioxide, & salts	Saccharin
U278	22781-23-3	1,3-Benzodioxol-4-ol, 2,2-dimethyl-, methyl carbamate	Bendiocarb
U364	22961-82-6	1,3-Benzodioxol-4-ol, 2,2-dimethyl-	Bendiocarb phenol
U203	94-59-7	1,3-Benzodioxole, 5-(2-propenyl)-	Safrole
U141	120-58-1	1,3-Benzodioxole, 5-(1-propenyl)-	Isosafrole
U090	94-58-6	1,3-Benzodioxole, 5-propyl-	Dihydrosafrole
U367	1563-38-8	7-Benzofuranol, 2,3-dihydro-2,2-dimethyl	Carbofuran phenol
U064	189-55-9	Benzo[rst]pentaphene	Dibenzo[a,i]pyrene
U248	[1]81-81-2	2H-1-Benzopyran-2-one, 4-hydroxy-3-(3-oxo-1-phenyl-butyl)-, & salts, when present at concentrations of 0.3% or less	Warfarin
U022	50-32-8	Benzo[a]pyrene	Same

Hazardous waste No.	Chemical abstracts No.	Substance	Common Name
U197	106-51-4	p-Benzoquinone	1,4-Benzoquinone
U023	98-07-7	Benzotrichloride (C,R,T)	Same
U085	1464-53-5	2,2'-Bioxirane	1,2:3,4-Diepoxybutane
U021	92-87-5	[1,1'-Biphenyl]-4,4'-diamine	Benzidine
U073	91-94-1	[1,1'-Biphenyl]-4,4'-diamine, 3,3'-dichloro-	3,3'-Dichlorobenzidine
U091	119-90-4	[1,1'-Biphenyl]-4,4'-diamine, 3,3'-dimethoxy-	3,3'-Dimethoxybenzidine
U095	119-93-7	[1,1'-Biphenyl]-4,4'-diamine, 3,3'-dimethyl-	3,3'-Dimethylbenzidine
U225	75-25-2	Bromoform	Tribromomethane
U030	101-55-3	4-Bromophenyl phenyl ether	P-Bromophenyl phenyl ether
U128	87-68-3	1,3-Butadiene, 1,1,2,3,4,4-hexachloro-	Hexachloro-1,3-butadiene
U172	924-16-3	1-Butanamine, N-butyl-N-nitroso-	N-N-Dibutylnitrosoamine
U031	71-36-3	1-Butanol (I)	N-Butyl alcohol
U159	78-93-3	2-Butanone (I,T)	Methyl ethyl ketone (MEK)
U160	1338-23-4	2-Butanone, peroxide (R,T)	Methyl ethyl ketone peroxide
U053	4170-30-3	2-Butenal	Crotonaldehyde
U074	764-41-0	2-Butene, 1,4-dichloro- (I,T)	1,4-Dichloro-2-butene
U143	303-34-4	2-Butenoic acid, 2-methyl-, 7-[[2,3-dihydroxy- 2-(1-methoxyethyl)-3-methyl-1-oxobutoxy]methyl]- 2,3,5,7a-tetrahydro-1H-pyrrolizin-1-yl ester, [1S-[1alpha(Z),7(2S*,3R*),7aalpha]]-	Lasiocarpine
U031	71-36-3	n-Butyl alcohol (I)	Butanol
U136	75-60-5	Cacodylic acid	Same
U032	13765-19-0	Calcium chromate	Same
U372	10605-21-7	Carbamic acid, 1H-benzimidazol-2-yl, methyl ester	Carbendazim
U271	17804-35-2	Carbamic acid, [1-[(butylamino)carbonyl]-1H-benzimidazol-2-yl]-, methyl ester	Benomyl
U280	101-27-9	Carbamic acid, (3-chlorophenyl)-, 4-chloro-2-butynyl ester	Barban
U238	51-79-6	Carbamic acid, ethyl ester	Ethyl carbamate (urethane)
U178	615-53-2	Carbamic acid, methylnitroso-, ethyl ester	N-Nitroso-N-methylurethane
U373	122-42-9	Carbamic acid, phenyl-, 1-methylethyl ester	Propham

Hazardous waste No.	Chemical abstracts No.	Substance	Common Name
U409	23564-05-8	Carbamic acid, [1,2-phenylenebis (iminocarbonothioyl)]bis-, dimethyl ester	Thiophanate-methyl
U097	79-44-7	Carbamic chloride, dimethyl-	Dimethylcarbamoyl chloride
U114	[1]111-54-6	Carbamodithioic acid, 1,2-ethanediylbis-, salts & esters	Ethylenebisdithiocarbamic acid
U062	2303-16-4	Carbamothioic acid, bis(1-methylethyl)-, S-(2,3-dichloro-2-propenyl) ester	Diallate
U389	2303-17-5	Carbamothioic acid, bis(1-methylethyl)-, S-(2,3,3-trichloro-2-propenyl) ester	Triallate
U387	52888-80-9	Carbamothioic acid, dipropyl-, S-(phenylmethyl) ester	Prosulfocarb
U279	63-25-2	Carbaryl	Same
U372	10605-21-7	Carbendazim	Same
U367	1563-38-8	Carbofuran phenol	Same
U215	6533-73-9	Carbonic acid, dithallium(1+) salt	Thallium (I) carbonate
U033	353-50-4	Carbonic difluoride	Carbon oxyfluoride
U156	79-22-1	Carbonochloridic acid, methyl ester (I,T)	Methyl chlorocarbonate
U033	353-50-4	Carbon oxyfluoride (R,T)	Same
U211	56-23-5	Carbon tetrachloride	Same
U034	75-87-6	Chloral	Same
U035	305-03-3	Chlorambucil	Same
U036	57-74-9	Chlordane, alpha & gamma isomers	Same
U026	494-03-1	Chlornaphazin	Same
U037	108-90-7	Chlorobenzene	Same
U038	510-15-6	Chlorobenzilate	Same
U039	59-50-7	p-Chloro-m-cresol	Same
U042	110-75-8	2-Chloroethyl vinyl ether	Same
U044	67-66-3	Chloroform	Same
U046	107-30-2	Chloromethyl methyl ether	Same
U047	91-58-7	beta-Chloronaphthalene	Same
U048	95-57-8	o-Chlorophenol	Same
U049	3165-93-3	4-Chloro-o-toluidine, hydrochloride	Same
U032	13765-19-0	Chromic acid H_2CrO_4, calcium salt	Calcium chromate
U050	218-01-9	Chrysene	Same
U051		Creosote	Same
U052	1319-77-3	Cresol (Cresylic acid)	Same

Hazardous waste No.	Chemical abstracts No.	Substance	Common Name
U053	4170-30-3	Crotonaldehyde	Same
U055	98-82-8	Cumene (I)	Same
U246	506-68-3	Cyanogen bromide (CN)Br	Cyanogen bromide
U197	106-51-4	2,5-Cyclohexadiene-1,4-dione	1,4-Benzoquinone
U056	110-82-7	Cyclohexane (I)	Same
U129	58-89-9	Cyclohexane, 1,2,3,4,5,6-hexachloro-,(1alpha,2alpha,3beta,4alpha,5alpha,6beta)-	Lindane
U057	108-94-1	Cyclohexanone (I)	Same
U130	77-47-4	1,3-Cyclopentadiene, 1,2,3,4,5,5-hexachloro-	Hexachlorocyclopentadiene
U058	50-18-0	Cyclophosphamide	Same
U240	[1]94-75-7	2,4-D, salts & esters	Same
U059	20830-81-3	Daunomycin	Same
U060	72-54-8	DDD	Same
U061	50-29-3	DDT	Same
U062	2303-16-4	Diallate	Same
U063	53-70-3	Dibenz[a,h]anthracene	Same
U064	189-55-9	Dibenzo[a,i]pyrene	Same
U066	96-12-8	1,2-Dibromo-3-chloropropane	Same
U069	84-74-2	Dibutyl phthalate	Same
U070	95-50-1	o-Dichlorobenzene	Same
U071	541-73-1	m-Dichlorobenzene	Same
U072	106-46-7	p-Dichlorobenzene	Same
U073	91-94-1	3,3'-Dichlorobenzidine	Same
U074	764-41-0	1,4-Dichloro-2-butene (I,T)	Same
U075	75-71-8	Dichlorodifluoromethane	Same
U078	75-35-4	1,1-Dichloroethylene	Same
U079	156-60-5	1,2-Dichloroethylene	Same
U025	111-44-4	Dichloroethyl ether	Same
U027	108-60-1	Dichloroisopropyl ether	Same
U024	111-91-1	Dichloromethoxy ethane	Same
U081	120-83-2	2,4-Dichlorophenol	Same
U082	87-65-0	2,6-Dichlorophenol	Same
U084	542-75-6	1,3-Dichloropropene	Same
U085	1464-53-5	1,2:3,4-Diepoxybutane (I,T)	Same
U395	5952-26-1	Diethylene glycol, dicarbamate	Same
U108	123-91-1	1,4-Diethyleneoxide	Same

Hazardous waste No.	Chemical abstracts No.	Substance	Common Name
U028	117-81-7	Diethylhexyl phthalate	Same
U086	1615-80-1	N,N'-Diethylhydrazine	Same
U087	3288-58-2	O,O-Diethyl S-methyl dithiophosphate	Same
U088	84-66-2	Diethyl phthalate	Same
U089	56-53-1	Diethylstilbesterol	Same
U090	94-58-6	Dihydrosafrole	Same
U091	119-90-4	3,3'-Dimethoxybenzidine	Same
U092	124-40-3	Dimethylamine (I)	Same
U093	60-11-7	p-Dimethylaminoazobenzene	Same
U094	57-97-6	7,12-Dimethylbenz[a]anthracene	Same
U095	119-93-7	3,3'-Dimethylbenzidine	Same
U096	80-15-9	alpha,alpha-Dimethylbenzylhydroperoxide (R)	Cumene hydroperoxide
U097	79-44-7	Dimethylcarbamoyl chloride	Same
U098	57-14-7	1,1-Dimethylhydrazine	Same
U099	540-73-8	1,2-Dimethylhydrazine	Same
U101	105-67-9	2,4-Dimethylphenol	Same
U102	131-11-3	Dimethyl phthalate	Same
U103	77-78-1	Dimethyl sulfate	Same
U105	121-14-2	2,4-Dinitrotoluene	Same
U106	606-20-2	2,6-Dinitrotoluene	Same
U107	117-84-0	Di-n-octyl phthalate	Same
U108	123-91-1	1,4-Dioxane	Same
U109	122-66-7	1,2-Diphenylhydrazine	Same
U110	142-84-7	Dipropylamine (I)	Same
U111	621-64-7	Di-n-propylnitrosamine	Same
U041	106-89-8	Epichlorohydrin	Same
U001	75-07-0	Ethanal (I)	Acetaldehyde
U404	121-44-8	Ethanamine, N,N-diethyl-	Triethylamine
U174	55-18-5	Ethanamine, N-ethyl-N-nitroso-	N-Nitrosodiethylamine
U155	91-80-5	1,2-Ethanediamine, N,N-dimethyl-N'-2-pyridinyl-N'-(2-thienylmethyl)-	Methapyrilene
U067	106-93-4	Ethane, 1,2-dibromo-	Ethylene dibromide
U076	75-34-3	Ethane, 1,1-dichloro-	1,1-Dichloroethane
U077	107-06-2	Ethane, 1,2-dichloro-	1,2-Dichloroethane
U131	67-72-1	Ethane, hexachloro-	Hexachloroethane

Hazardous waste No.	Chemical abstracts No.	Substance	Common Name
U024	111-91-1	Ethane, 1,1'-[methylenebis(oxy)]bis[2-chloro-	Dichloromethoxy ethane
U117	60-29-7	Ethane, 1,1'-oxybis-(I)	Ethyl ether
U025	111-44-4	Ethane, 1,1'-oxybis[2-chloro-	Dichloroethyl ether
U184	76-01-7	Ethane, pentachloro-	Pentachloroethane
U208	630-20-6	Ethane, 1,1,1,2-tetrachloro-	1,1,1,2-Tetrachloroethane
U209	79-34-5	Ethane, 1,1,2,2-tetrachloro-	1,1,2,2-Tetrachloroethane
U218	62-55-5	Ethanethioamide	Thioacetamide
U226	71-55-6	Ethane, 1,1,1-trichloro-	1,1,1-Trichloroethane
U227	79-00-5	Ethane, 1,1,2-trichloro-	1,1,2-Trichloroethane
U410	59669-26-0	Ethanimidothioic acid, N,N'-[thiobis[(methylimino)carbonyloxy]] bis-, dimethyl ester	Thiodicarb
U394	30558-43-1	Ethanimidothioic acid, 2-(dimethylamino)-N-hydroxy-2-oxo-, methyl ester	A2213
U359	110-80-5	Ethanol, 2-ethoxy-	Ethylene glycol monoethyl ether
U173	1116-54-7	Ethanol, 2,2'-(nitrosoimino)bis-	N-Nitrosodiethanolamine
U395	5952-26-1	Ethanol, 2,2'-oxybis-, dicarbamate	Diethylene glycol, dicarbamate
U004	98-86-2	Ethanone, 1-phenyl-	Acetophenone
U043	75-01-4	Ethene, chloro-	Vinyl chloride
U042	110-75-8	Ethene, (2-chloroethoxy)-	2-Chloroethyl vinyl ether
U078	75-35-4	Ethene, 1,1-dichloro-	1,1-Dichloroethylene
U079	156-60-5	Ethene, 1,2-dichloro-, (E)-	1,2-Dichloroethylene
U210	127-18-4	Ethene, tetrachloro-	Tetrachloroethylene
U228	79-01-6	Ethene, trichloro-	Trichloroethylene
U112	141-78-6	Ethyl acetate (I)	Same
U113	140-88-5	Ethyl acrylate (I)	Same
U238	51-79-6	Ethyl carbamate (urethane)	Same
U117	60-29-7	Ethyl ether (I)	Same
U114	[1]111-54-6	Ethylenebisdithiocarbamic acid, salts & esters	Same
U067	106-93-4	Ethylene dibromide	Same
U077	107-06-2	Ethylene dichloride	Same
U359	110-80-5	Ethylene glycol monoethyl ether	Same
U115	75-21-8	Ethylene oxide (I,T)	Same
U116	96-45-7	Ethylenethiourea	Same
U076	75-34-3	Ethylidene dichloride	Same
U118	97-63-2	Ethyl methacrylate	Same

Hazardous waste No.	Chemical abstracts No.	Substance	Common Name
U119	62-50-0	Ethyl methanesulfonate	Same
U120	206-44-0	Fluoranthene	Same
U122	50-00-0	Formaldehyde	Same
U123	64-18-6	Formic acid (C,T)	Same
U124	110-00-9	Furan (I)	Same
U125	98-01-1	2-Furancarboxaldehyde (I)	Furfural
U147	108-31-6	2,5-Furandione	Maleic anhydride
U213	109-99-9	Furan, tetrahydro-(I)	Tetrahydrofuran
U125	98-01-1	Furfural (I)	Same
U124	110-00-9	Furfuran (I)	Same
U206	18883-66-4	Glucopyranose, 2-deoxy-2-(3-methyl-3-nitrosoureido)-, D-	Streptozotocin
U206	18883-66-4	D-Glucose, 2-deoxy-2-[[(methylnitrosoamino)- carbonyl]amino]-	Streptozotocin
U126	765-34-4	Glycidylaldehyde	Same
U163	70-25-7	Guanidine, N-methyl-N'-nitro-N-nitroso-	MNNG
U127	118-74-1	Hexachlorobenzene	Same
U128	87-68-3	Hexachlorobutadiene	Same
U130	77-47-4	Hexachlorocyclopentadiene	Same
U131	67-72-1	Hexachloroethane	Same
U132	70-30-4	Hexachlorophene	Same
U243	1888-71-7	Hexachloropropene	Same
U133	302-01-2	Hydrazine (R,T)	Same
U086	1615-80-1	Hydrazine, 1,2-diethyl-	N,N-Diethylhydrazine
U098	57-14-7	Hydrazine, 1,1-dimethyl-	1,1-Dimethylhydrazine
U099	540-73-8	Hydrazine, 1,2-dimethyl-	1,2-Dimethylhydrazine
U109	122-66-7	Hydrazine, 1,2-diphenyl-	1,2-Diphenylhydrazine
U134	7664-39-3	Hydrofluoric acid (C,T)	Same
U134	7664-39-3	Hydrogen fluoride (C,T)	Hydrofluoric acid
U135	7783-06-4	Hydrogen sulfide	Same
U135	7783-06-4	Hydrogen sulfide H_2S	Same
U096	80-15-9	Hydroperoxide, 1-methyl-1-phenylethyl- (R)	Cumene hydroperoxide
U116	96-45-7	2-Imidazolidinethione	Ethylene thiourea
U137	193-39-5	Indeno[1,2,3-cd]pyrene	Same
U190	85-44-9	1,3-Isobenzofurandione	Phthalic anhydride
U140	78-83-1	Isobutyl alcohol (I,T)	Same

Hazardous waste No.	Chemical abstracts No.	Substance	Common Name
U141	120-58-1	Isosafrole	Same
U142	143-50-0	Kepone	Same
U143	303-34-4	Lasiocarpine	Same
U144	301-04-2	Lead acetate	Same
U146	1335-32-6	Lead, bis(acetato-O)tetrahydroxytri-	Lead subacetate
U145	7446-27-7	Lead phosphate	Same
U146	1335-32-6	Lead subacetate	Same
U129	58-89-9	Lindane	Same
U163	70-25-7	MNNG	Same
U147	108-31-6	Maleic anhydride	Same
U148	123-33-1	Maleic hydrazide	Same
U149	109-77-3	Malononitrile	Same
U150	148-82-3	Melphalan	Same
U151	7439-97-6	Mercury	Same
U152	126-98-7	Methacrylonitrile (I, T)	Same
U092	124-40-3	Methanamine, N-methyl- (I)	Dimethylamine
U029	74-83-9	Methane, bromo-	Methyl bromide
U045	74-87-3	Methane, chloro- (I, T)	Methyl chloride
U046	107-30-2	Methane, chloromethoxy-	Chloromethyl methyl ether
U068	74-95-3	Methane, dibromo-	Dibromomethane
U080	75-09-2	Methane, dichloro-	Dichloromethane
U075	75-71-8	Methane, dichlorodifluoro-	Dichlorodifluoromethane
U138	74-88-4	Methane, iodo-	Iodomethane
U119	62-50-0	Methanesulfonic acid, ethyl ester	Ethyl methane sulfonate
U211	56-23-5	Methane, tetrachloro-	Carbon tetrachloride
U153	74-93-1	Methanethiol (I, T)	Methyl mercaptan
U225	75-25-2	Methane, tribromo-	Tribromomethane
U044	67-66-3	Methane, trichloro-	Chloroform
U121	75-69-4	Methane, trichlorofluoro-	Trichlorofluoromethane
U036	57-74-9	4,7-Methano-1H-indene, 1,2,4,5,6,7,8,8-octachloro-2,3,3a,4,7,7a-hexahydro-	Chlordane
U154	67-56-1	Methanol (I)	Same
U155	91-80-5	Methapyrilene	Same
U142	143-50-0	1,3,4-Metheno-2H-cyclobuta[cd]pentalen-2-one, 1,1a,3,3a,4,5,5,5a,5b,6-decachlorooctahydro-	Chlordecone

Hazardous waste No.	Chemical abstracts No.	Substance	Common Name
U247	72-43-5	Methoxychlor	Same
U154	67-56-1	Methyl alcohol (I)	Methanol
U029	74-83-9	Methyl bromide	Same
U186	504-60-9	1-Methylbutadiene (I)	1,3-Pentadiene
U045	74-87-3	Methyl chloride (I,T)	Same
U156	79-22-1	Methyl chlorocarbonate (I,T)	Same
U226	71-55-6	Methyl chloroform	1,1,1-Trichloroethane
U157	56-49-5	3-Methylcholanthrene	Same
U158	101-14-4	4,4'-Methylenebis(2-chloroaniline)	Same
U068	74-95-3	Methylene bromide	Dibromomethane
U080	75-09-2	Methylene chloride	Same
U159	78-93-3	Methyl ethyl ketone (MEK) (I,T)	Same
U160	1338-23-4	Methyl ethyl ketone peroxide (R,T)	Same
U138	74-88-4	Methyl iodide	Same
U161	108-10-1	Methyl isobutyl ketone (I)	Same
U162	80-62-6	Methyl methacrylate (I,T)	Same
U161	108-10-1	4-Methyl-2-pentanone (I)	Methyl isobutyl ketone
U164	56-04-2	Methylthiouracil	Same
U010	50-07-7	Mitomycin C	Same
U059	20830-81-3	5,12-Naphthacenedione, 8-acetyl-10-[(3-amino-2,3,6-trideoxy)-alpha-L-lyxo-hexopyranosyl)oxy]-7,8,9,10-tetrahydro-6,8,11-trihydroxy-1-methoxy-, (8S-cis)-	Daunomycin
U167	134-32-7	1-Naphthalenamine	Same
U168	91-59-8	2-Naphthalenamine	Same
U026	494-03-1	Naphthalenamine, N,N'-bis(2-chloroethyl)-	Chlornaphazine
U165	91-20-3	Naphthalene	Same
U047	91-58-7	Naphthalene, 2-chloro-	2-Chloronaphthalene
U166	130-15-4	1,4-Naphthalenedione	1,4-Naphthoquinone
U236	72-57-1	2,7-Naphthalenedisulfonic acid, 3,3'-[(3,3'-dimethyl[1,1'-biphenyl]-4,4'-diyl)bis(azo)bis[5-amino-4-hydroxy]-, tetrasodium salt	
U279	63-25-2	1-Naphthalenol, methylcarbamate	Trypan blue
U166	130-15-4	1,4-Naphthoquinone	Carbaryl
U167	134-32-7	alpha-Naphthylamine	Same
U168	91-59-8	beta-Naphthylamine	Same
U217	10102-45-1	Nitric acid, thallium(1+) salt	Thallous nitrate

Hazardous waste No.	Chemical abstracts No.	Substance	Common Name
U169	98-95-3	Nitrobenzene (I,T)	Same
U170	100-02-7	p-Nitrophenol	Same
U171	79-46-9	2-Nitropropane (I,T)	Same
U172	924-16-3	N-Nitrosodi-n-butylamine	N,N-Dibutylnitrosoamine
U173	1116-54-7	N-Nitrosodiethanolamine	Same
U174	55-18-5	N-Nitrosodiethylamine	Same
U176	759-73-9	N-Nitroso-N-ethylurea	Same
U177	684-93-5	N-Nitroso-N-methylurea	Same
U178	615-53-2	N-Nitroso-N-methylurethane	Same
U179	100-75-4	N-Nitrosopiperidine	Same
U180	930-55-2	N-Nitrosopyrrolidine	Same
U181	99-55-8	5-Nitro-o-toluidine	Same
U193	1120-71-4	1,2-Oxathiolane, 2,2-dioxide	1,3-Propane sultone
U058	50-18-0	2H-1,3,2-Oxazaphosphorin-2-amine, N,N-bis(2-chloroethyl)tetrahydro-, 2-oxide	Cyclophosphamide
U115	75-21-8	Oxirane (I,T)	Ethylene oxide
U126	765-34-4	Oxiranecarboxyaldehyde	Glycidaldehyde
U041	106-89-8	Oxirane, (chloromethyl)-	Epichlorohydrin
U182	123-63-7	Paraldehyde	Same
U183	608-93-5	Pentachlorobenzene	Same
U184	76-01-7	Pentachloroethane	Same
U185	82-68-8	Pentachloronitrobenzene (PCNB)	Same
See F027	87-86-5	Pentachlorophenol	Same
U161	108-10-1	Pentanol, 4-methyl-	Methyl isobutyl ketone
U186	504-60-9	1,3-Pentadiene (I)	Same
U187	62-44-2	Phenacetin	Same
U188	108-95-2	Phenol	Same
U048	95-57-8	Phenol, 2-chloro-	o-chlorophenol
U039	59-50-7	Phenol, 4-chloro-3-methyl-	p-chloro-m-cresol
U081	120-83-2	Phenol, 2,4-dichloro-	2,4-Dichlorophenol
U082	87-65-0	Phenol, 2,6-dichloro-	2,6-Dichlorophenol
U089	56-53-1	Phenol, 4,4'-(1,2-diethyl-1,2-ethenediyl)bis-, (E)-	Diethylstilbestrol
U101	105-67-9	Phenol, 2,4-dimethyl-	2,4-Dimethylphenol
U052	1319-77-3	Phenol, methyl-	Cresol (cresylic acid)
U132	70-30-4	Phenol, 2,2'-methylenebis[3,4,6-trichloro-	Hexachlorophene

Hazardous waste No.	Chemical abstracts No.	Substance	Common Name
U411	114-26-1	Phenol, 2-(1-methylethoxy)-,methylcarbamate	Propoxur
U170	100-02-7	Phenol, 4-nitro-	p-Nitrophenol
See F027	87-86-5	Phenol, pentachloro-	Pentachlorophenol
See F027	58-90-2	Phenol, 2,3,4,6-tetrachloro-	2,3,4,6-Tetrachlorophenol
See F027	95-95-4	Phenol, 2,4,5-trichloro-	2,4,5-Trichlorophenol
See F027	88-06-2	Phenol, 2,4,6-trichloro-	2,4,6-Trichlorophenol
U150	148-82-3	L-Phenylalanine, 4-[bis(2-chloroethyl)amino]-	Melphalan
U145	7446-27-7	Phosphoric acid, lead(2+) salt (2:3)	Lead phosphate
U087	3288-58-2	Phosphorodithioic acid, O,O-diethyl S-methyl ester	O,O-Diethyl S-methyl dithiophosphate
U189	1314-80-3	Phosphorus sulfide (R)	Phosphorus pentasulfide
U190	85-44-9	Phthalic anhydride	Same
U191	109-06-8	2-Picoline	Same
U179	100-75-4	Piperidine, 1-nitroso-	N-Nitrosopiperidine
U192	23950-58-5	Pronamide	Same
U194	107-10-8	1-Propanamine (I,T)	n-proylamine
U111	621-64-7	1-Propanamine, N-nitroso-N-propyl-	Di-n-propylnitrosamine
U110	142-84-7	1-Propanamine, N-propyl- (I)	Dipropylamine
U066	96-12-8	Propane, 1,2-dibromo-3-chloro-	1,2-Dibromo-3-chloropropane
U083	78-87-5	Propane, 1,2-dichloro-	Propylene dichloride
U149	109-77-3	Propanedinitrile	Malononitrile
U171	79-46-9	Propane, 2-nitro- (I,T)	2-Nitropropane
U027	108-60-1	Propane, 2,2'-oxybis[2-chloro-	Dichloroisopropyl ether
U193	1120-71-4	1,3-Propane sultone	Same
See F027	93-72-1	Propanoic acid, 2-(2,4,5-trichlorophenoxy)-	2,4,5-TP
U235	126-72-7	1-Propanol, 2,3-dibromo-, phosphate (3:1)	Tris(2,3-dibromopropyl) phosphate
U140	78-83-1	1-Propanol, 2-methyl- (I,T)	Isobutyl alcohol
U002	67-64-1	2-Propanone (I)	Acetone
U007	79-06-1	2-Propenamide	Acrylamide
U084	542-75-6	1-Propene, 1,3-dichloro-	1,3-Dichloropropene
U243	1888-71-7	1-Propene, 1,1,2,3,3,3-hexachloro-	Hexachloropropene
U009	107-13-1	2-Propenenitrile	Acrylonitrile
U152	126-98-7	2-Propenenitrile, 2-methyl- (I,T)	Methacrylonitrile
U008	79-10-7	2-Propenoic acid (I)	Acrylic acid

Hazardous waste No.	Chemical abstracts No.	Substance	Common Name
U113	140-88-5	2-Propenoic acid, ethyl ester (I)	Ethyl acrylate
U118	97-63-2	2-Propenoic acid, 2-methyl-, ethyl ester	Ethyl methacrylate
U162	80-62-6	2-Propenoic acid, 2-methyl-, methyl ester (I,T)	Methyl methacrylate
U373	122-42-9	Propham	Same
U411	114-26-1	Propoxur	Same
U194	107-10-8	n-Propylamine (I,T)	Same
U083	78-87-5	Propylene dichloride	Same
U387	52888-80-9	Prosulfocarb	Same
U148	123-33-1	3,6-Pyridazinedione, 1,2-dihydro-	Maleic hydrazide
U196	110-86-1	Pyridine	Same
U191	109-06-8	Pyridine, 2-methyl-	2-Picoline
U237	66-75-1	2,4-(1H,3H)-Pyrimidinedione, 5-[bis(2-chloroethyl)amino]-	Uracil mustard
U164	56-04-2	4(1H)-Pyrimidinone, 2,3-dihydro-6-methyl-2-thioxo-	Methylthiouracil
U180	930-55-2	Pyrrolidine, 1-nitroso-	n-Nitrosopyrrolidine
U200	50-55-5	Reserpine	Same
U201	108-46-3	Resorcinol	Same
U202	[1]81-07-2	Saccharin, & salts	Same
U203	94-59-7	Safrole	Same
U204	7783-00-8	Selenious acid	Selenium dioxide
U204	7783-00-8	Selenium dioxide	Same
U205	7488-56-4	Selenium sulfide	Same
U205	7488-56-4	Selenium sulfide SeS_2 (R,T)	Selenium (IV) disulfide
U015	115-02-6	L-Serine, diazoacetate (ester)	Azarserine
See F027	93-72-1	Silvex (2,4,5-TP)	Same
U206	18883-66-4	Streptozotocin	Same
U103	77-78-1	Sulfuric acid, dimethyl ester	Dimethyl sulfate
U189	1314-80-3	Sulfur phosphide (R)	Phosphorus pentasulfide
See F027	93-76-5	2,4,5-T	Same
U207	95-94-3	1,2,4,5-Tetrachlorobenzene	Same
U208	630-20-6	1,1,1,2-Tetrachloroethane	Same
U209	79-34-5	1,1,2,2-Tetrachloroethane	Same
U210	127-18-4	Tetrachloroethylene	Same
See F027	58-90-2	2,3,4,6-Tetrachlorophenol	Same

Hazardous waste No.	Chemical abstracts No.	Substance	Common Name
U213	109-99-9	Tetrahydrofuran (I)	Same
U214	563-68-8	Thallium(I) acetate	Same
U215	6533-73-9	Thallium(I) carbonate	Same
U216	7791-12-0	Thallium(I) chloride	Same
U216	7791-12-0	Thallium chloride TlCl	Thallous chloride
U217	10102-45-1	Thallium(I) nitrate	Thallous nitrate
U218	62-55-5	Thioacetamide	Same
U410	59669-26-0	Thiodicarb	Same
U153	74-93-1	Thiomethanol (I,T)	Methyl mercaptan
U244	137-26-8	Thioperoxydicarbonic diamide $[(H_2N)C(S)]_2S_2$, tetramethyl-	Thiram
U409	23564-05-8	Thiophanate-methyl	Same
U219	62-56-6	Thiourea	Same
U244	137-26-8	Thiram	Same
U220	108-88-3	Toluene	Same
U221	25376-45-8	Toluenediamine	Same
U223	26471-62-5	Toluene diisocyanate (R,T)	Same
U328	95-53-4	o-Toluidine	Same
U353	106-49-0	p-Toluidine	Same
U222	636-21-5	o-Toluidine hydrochloride	Same
U389	2303-17-5	Triallate	Same
U011	61-82-5	1H-1,2,4-Triazol-3-amine	Amitrole
U227	79-00-5	1,1,2-Trichloroethane	Same
U228	79-01-6	Trichloroethylene	Same
U121	75-69-4	Trichloromonofluoromethane	Same
See F027	95-95-4	2,4,5-Trichlorophenol	Same
See F027	88-06-2	2,4,6-Trichlorophenol	Same
U404	121-44-8	Triethylamine	Same
U234	99-35-4	1,3,5-Trinitrobenzene (R,T)	Same
U182	123-63-7	1,3,5-Trioxane, 2,4,6-trimethyl-	Paraldehyde
U235	126-72-7	Tris(2,3-dibromopropyl) phosphate	Same
U236	72-57-1	Trypan blue	Same
U237	66-75-1	Uracil mustard	Same
U176	759-73-9	Urea, N-ethyl-N-nitroso-	N-Nitroso-N-ethlurea
U177	684-93-5	Urea, N-methyl-N-nitroso-	N-Nitroso-N-methylurea
U043	75-01-4	Vinyl chloride	Same

Hazardous waste No.	Chemical abstracts No.	Substance	Common Name
U248	[1]81-81-2	Warfarin, & salts, when present at concentrations of 0.3% or less	Same
U239	1330-20-7	Xylene (I)	Same
U200	50-55-5	Yohimban-16-carboxylic acid, 11,17-dimethoxy-18-[(3,4,5-trimethoxybenzoyl)oxy]-, methyl ester, (3beta,16beta,17alpha,18beta,20alpha)-	Reserpine
U249	1314-84-7	Zinc phosphide Zn_3P_2, when present at concentrations of 10% or less	Zinc phosphide

FOOTNOTE: [1]CAS Number given for parent compound only.

APPENDIX E 49 CFR definitions: oxidizer, forbidden explosive, Class 1 explosive

Code of Federal Regulations
Title 49, Volume 2, Parts 100 to 185
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TITLE 49--TRANSPORTATION

CHAPTER I--RESEARCH AND SPECIAL PROGRAMS ADMINISTRATION, DEPARTMENT OF TRANSPORTATION

173--SHIPPERS--GENERAL REQUIREMENTS FOR SHIPMENTS AND PACKAGINGS

Sec. 173.127 Class 5, Division 5.1--Definition and assignment of packing groups.

(a) Definition. For the purpose of this subchapter, **oxidizer** (Division 5.1) means a material that may, generally by yielding oxygen, cause or enhance the combustion of other materials.

(1) A solid material is classed as a Division 5.1 material if, when tested in accordance with the UN Manual of Tests and Criteria, its mean burning time is less than or equal to the burning time of a 3:7 potassium bromate/cellulose mixture.

(2) A liquid material is classed as a Division 5.1 material if, when tested in accordance with the UN Manual of Tests and Criteria, it spontaneously ignites or its mean time for a pressure rise from 690 kPa to 2070 kPa gauge is less then the time of a 1:1 nitric acid (65 percent)/cellulose mixture.

(b) Assignment of packing groups.

(1) The packing group of a Division 5.1 material which is a solid shall be assigned using the following criteria:

(i) Packing Group I, for any material which, in either concentration tested, exhibits a mean burning time less than the mean burning time of a 3:2 potassium bromate/cellulose mixture.

(ii) Packing Group II, for any material which, in either concentration tested, exhibits a mean burning time less than or equal to the mean burning time of a 2:3 potassium bromate/cellulose mixture and the criteria for Packing Group I are not met.

(iii) Packing Group III for any material which, in either concentration tested, exhibits a mean burning time less than or equal to the mean burning time of a 3:7 potassium bromate/cellulose mixture and the criteria for Packing Group I and II are not met.

(2) The packing group of a Division 5.1 material which is a liquid shall be assigned using the following criteria:

(i) Packing Group I for:

(A) Any material which spontaneously ignites when mixed with cellulose in a 1:1 ratio; or

(B) Any material which exhibits a mean pressure rise time less than the pressure rise time of a 1:1 perchloric acid (50 percent)/cellulose mixture.

(ii) Packing Group II, any material which exhibits a mean pressure rise time less than or equal to the pressure rise time of a 1:1 aqueous sodium chlorate solution (40 percent)/cellulose mixture and the criteria for Packing Group I are not met. (iii) Packing Group III, any material which exhibits a mean pressure rise time less than or equal to the pressure rise time of a 1:1 nitric acid (65 percent)/cellulose mixture and the criteria for Packing Group I and II are not met.

Subpart C--Definitions, Classification and Packaging for Class 1

Sec. 173.50 Class 1--definitions.

(a) Explosive. For the purpose of this subchapter, an explosive means any substance or article, including a device, which is designed to function by explosion (i.e., an extremely rapid release of gas and heat) or which, by chemical reaction within itself, is able to function in a similar manner even if not designed to function by explosion, unless the substance or article is otherwise classed under the provision of this subchapter.

(b) Explosives in Class 1 are divided into six divisions as follows:

(1) Division 1.1 consists of explosives that have a mass explosion hazard. A mass explosion is one which affects almost the entire load instantaneously.

(2) Division 1.2 consists of explosives that have a projection hazard but not a mass explosion hazard.

(3) Division 1.3 consists of explosives that have a fire hazard and either a minor blast hazard or a minor projection hazard or both, but not a mass explosion hazard.

(4) Division 1.4 consists of explosives that present a minor explosion hazard. The explosive effects are largely confined to the package and no projection of fragments of appreciable size or range is to be expected. An external fire must not cause virtually instantaneous explosion of almost the entire contents of the package.

(5) Division 1.5 [1] consists of very insensitive explosives. This division is comprised of substances which have a mass explosion hazard but are so insensitive that there is very little probability of initiation or of transition from burning to detonation under normal conditions of transport.

(6) Division 1.6 [2] consists of extremely insensitive articles which do not have a mass explosive hazard. This division is comprised of articles which contain only extremely insensitive detonating substances and which demonstrate a negligible probability of accidental initiation or propagation.

Sec. 173.51 Authorization to offer and transport explosives.

(a) Unless otherwise provided in this subpart, no person may offer for transportation or transport an explosive, unless it has been tested and classed and approved by the Associate Administrator for Hazardous Materials Safety (Sec. 173.56).

(b) Reports of explosives approved by the Department of Defense or the Department of Energy must be filed with, and receive acknowledgment in writing by, the Associate Administrator for Hazardous Materials Safety prior to such explosives being offered for transportation.

Sec. 173.52 Classification codes and compatibility groups of explosives.

(a) The classification code for an explosive, which is assigned by the Associate Administrator

[1] The probability of transition from burning to detonation is greater when large quantities are transported in a vessel.

[2] The risk from articles of Division 1.6 is limited to the explosion of a single article.

for Hazardous Materials Safety in accordance with this subpart, consists of the division number followed by the compatibility group letter. Compatibility group letters are used to specify the controls for the transportation, and storage related thereto, of explosives and to prevent an increase in hazard that might result if certain types of explosives were stored or transported together. Transportation compatibility requirements for carriers are prescribed in Secs. 174.81, 175.78. 176.83 and 177.848 of this subchapter for transportation by rail, air, vessel, and public highway, respectively, and storage incidental thereto.

(b) Compatibility groups and classification codes for the various types of explosives are set forth in the following tables. Table 1 sets forth compatibility groups and classification codes for substances and articles described in the first column of Table 1. Table 2 shows the number of classification codes that are possible within each explosive division. Altogether, there are 35 possible classification codes for explosives.

Table 1.--Classification Codes

Description of substances or article to be classified	Compatibility group	Classification code
Primary explosive substance	A	1.1A
Article containing a primary explosive substance and not containing two or more effective protective features. Some articles, such as detonators for blasting, detonator assemblies for blasting and primers, cap-type, are included, even though they do not contain primary explosives.	B	1.1B 1.2B 1.4B
Propellant explosive substance or other deflagrating explosive substance or article containing such explosive substance.	C	1.1C 1.2C 1.3C 1.4C
Secondary detonating explosive substance or black powder or article containing a secondary detonating explosive substance, in each case without means of initiation and without a propelling charge, or article containing a primary explosive substance and containing two or more effective protective features.	D	1.1D 1.2D 1.4D 1.5D
Article containing a secondary detonating explosive substance, without means of initiation, with a propelling charge (other than one containing flammable liquid gel or hypergolic liquid).	E	1.1E 1.2E 1.4E
Article containing a secondary detonating explosive substance with its means of initiation, with a propelling charge (other than one containing flammable liquid gel or hypergolic liquid) or without a propelling charge.	F	1.1F 1.2F 1.3F 1.4F
Pyrotechnic substance or article containing a pyrotechnic substance, or article containing both an explosive substance and an illuminating, incendiary, tear-producing or smoke-producing substance (other than a water-activated article or one containing white phosphorus, phosphide or flammable liquid or gel or hypergolic liquid).	G	1.1G 1.2G 1.3G 1.4G

Description of substances or article to be classified	Compatibility group	Classification code
Article containing both an explosive substance and white phosphorus.	H	1.2H 1.3H
Article containing both an explosive substance and flammable liquid or gel.	J	1.1J 1.2J 1.3J
Article containing both an explosive substance and a toxic chemical agent.	K	1.2K 1.3K
Explosive substance or article containing an explosive substance and presenting a special risk (e.g., due to water-activation or presence of hybergolic liquids, phosphides or pyrophoric substances) needing isolation of each type.	L	1.1L 1.2L 1.3L
Articles containing only extremely insensitive detonating substances.	N	1.6N
Substance or article so packed or designed that any hazardous effects arising from accidental functioning are limited to the extent that they do not significantly hinder or prohibit fire fighting or other emergency response efforts in the immediate vicinity of the package.	S	1.4S

Table 2.--Scheme of Classification of Explosives, Combination of Hazard Division With Compatibility Group

	Compatibility group													
Hazard division	A	B	C	D	E	F	G	H	J	K	L	N	S	A-S
1.1	1.1A	1.1B	1.1C	1.1D	1.1E	1.1F	1.1G	....	1.1J	.....	1.1L	.....	.....	9
1.2	.....	1.2B	1.2C	1.2D	1.2E	1.2F	1.2G	1.2H	1.2J	1.2K	1.2L			10
1.3	.....	.....	1.3C	.....	.....	1.3F	1.3G	1.3H	1.3J	1.3K	1.3L	.....	.....	7
1.4	.....	1.4B	1.4C	1.4D	1.4E	1.4F	1.4G	.....	.....	.....	.....	.....	1.4S	7
1.5	.....	.....	.....	1.5D	.....	.....	.....	.....	.....	.....	.....	.....	.....	1
1.6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1.6N	.....	1
1.6	1	3	4	4	3	4	4	2	3	2	3	1	1	35

Sec. 173.53 Provisions for using old classifications of explosives.

Where the classification system in effect prior to January 1, 1991, is referenced in State or local laws, ordinances or regulations not pertaining to the transportation of hazardous materials, the following table may be used to compare old and new hazard class names:

Current classification	Class name prior to Jan. 1, 1991
Division 1.1	Class A explosives.
Division 1.2	Class A or Class B explosives.
Division 1.3	Class B explosive.
Division 1.4	Class C explosives.
Division 1.5	Blasting agents.
Division 1.6	No applicable hazard class.

Sec. 173.54 Forbidden explosives.

Unless otherwise provided in this subchapter, the following explosives shall not be offered for transportation or transported:

(a) An explosive that has not been approved in accordance with Sec. 173.56 of this subpart.

(b) An explosive mixture or device containing a chlorate and also containing:

(1) An ammonium salt, including a substituted ammonium or quaternary ammonium salt; or

(2) An acidic substance, including a salt of a weak base and a strong acid.

(c) A leaking or damaged package of explosives.

(d) Propellants that are unstable, condemned or deteriorated.

(e) Nitroglycerin. diethylene glycol dinitrate, or any other liquid explosives not specifically authorized by this subchapter.

(f) A loaded firearm (except as provided in 14 CFR 108.11).

(g) Fireworks that combine an explosive and a detonator.

(h) Fireworks containing yellow or white phosphorus.

(I) A toy torpedo, the maximum outside dimension of which exceeds 23 mm (0.906 inch), or a toy torpedo containing a mixture of potassium chlorate, black antimony (antimony sulfide), and sulfur, if the weight of the explosive material in the device exceeds 0.26 g (0.01 ounce).

(j) Explosives specifically forbidden in the Sec. 172.101 Table of this subchapter.

(k) Explosives not meeting the acceptance criteria specified in Sec. 173.57 of this subchapter.

(l) An explosive article with its means of initiation or ignition installed, unless approved in accordance with Sec. 173.56.

Sec. 173.55 [Reserved

Sec. 173.56 New explosives--definition and procedures for classification and approval.

(a) Definition of new explosive. For the purposes of this subchapter a new explosive means an explosive produced by a person who:

(1) Has not previously produced that explosive; or

(2) Has previously produced that explosive but has made a change in the formulation, design or process so as to alter any of the properties of the explosive. An explosive will not be considered a ``new explosive'' if an agency listed in paragraph (b) of this section has determined, and confirmed in writing to the Associate Administrator for Hazardous Materials Safety, that there are no significant differences in hazard characteristics from the explosive previously approved.

(b) Examination, classing and approval. Except as provided in paragraph (j) of this section, no person may offer a new explosive for transportation unless that person has specified to the examining agency the ranges of composition of ingredients and compounds, showing the intended manufacturing tolerances in the composition of substances or design of articles which will be allowed in that material or device, and unless it has been examined, classed and approved as follows:

(1) A new explosive must be examined and assigned a recommended shipping description, class, and classification code by a person approved by the Associate Administrator for Hazardous Materials Safety. The recommendation of class and classification code must be based on the and criteria prescribed in Secs. 173.52, 173.57 and 173.58 of this subchapter. Each person requesting approval of a new explosive must submit a copy of the report of examination and assignment of recommended shipping description, class and classification code to the Associate Administrator for Hazardous Materials Safety for approval and must receive written approval and an EX-number from the Associate Administrator for Hazardous Materials Safety before offering that explosive for transportation.

(2) A new explosive made by or under the direction or supervision of a component of the DOD may be examined, classed, and concurred in by:

(I) U.S. Army Technical Center for Explosives Safety (SMCAC-EST), Naval Sea Systems Command (SEA-9934), or Air Force Safety Agency (SEW), when approved by the Chairman, DOD Explosives Board, in accordance with the Department of Defense Explosives Hazard Classification Procedures (TB 700-2, dated December 1989); or

(ii) The agencies and procedures specified in paragraph (b)(1) of this section.

(3) A new explosive made by or under the direction or supervision of the Department of Energy (DOE) may be--

(I) Examined by the DOE in accordance with the Explosives Hazard Classification

Procedures (TB 700-2, dated December, 1989), and must be classed and approved by DOE; or

(ii) Examined, classed, and approved in accordance with paragraph (b)(1) of this section.

(4) For a material shipped under the description of ``ammonium nitrate-fuel oil mixture (ANFO)", the only test required for classification purposes is the Cap Sensitivity Test (Test Method 5(a). prescribed in the Explosive Test Manual). The test must be performed by an agency listed in paragraph (b)(1), (b)(2), or (b)(3) of this section, the manufacturer, or the shipper. A copy of the test report must be submitted to the Associate Administrator for Hazardous Materials Safety before the material is offered for transportation, and a copy of the test report must be retained by the shipper for as long as that material is shipped. At a minimum, the test report must contain the name and address of the person or organization conducting the test, date of the test, quantitative description of the mixture. including prill size and porosity, and a description of the test results.

(c) Filing DOD or DOE approval report. DOD or DOE must file a copy of each approval, accompanied by supporting laboratory data, with the Associate Administrator for Hazardous Materials Safety and receive acknowledgment in writing before offering the new explosive for transportation, unless the new explosive is:

(1) Being transported under paragraph (d) or (e) of this section; or

(2) Covered by a national security classification currently in effect.

(d) Transportation of explosive samples for examination. Notwithstanding the requirements of paragraph (b) of this section with regard to the transportation of a new explosive that has not been approved, a person may offer a sample of a new explosive for transportation, by railroad, highway, or vessel from the place where it was produced to an agency identified in paragraph (b) of this section, for examination if--

(1) The new explosive has been assigned a tentative shipping description and class in writing by the testing agency;

(2) The new explosive is packaged as required by this part according to the tentative description and class assigned, unless otherwise specified in writing by the testing agency; and,

(3) The package is labeled as required by this subchapter and the following is marked on the package:

(i) The words ``SAMPLE FOR LABORATORY EXAMINATION";

(ii) The net weight of the new explosive; and

(iii) The tentative shipping name and identification number.

(e) Transportation of unapproved explosives for developmental testing. Notwithstanding the requirements of paragraph (b) of this section, the owner of a new explosive that has not been examined or approved may transport that new explosive from the place where it was produced to an explosives testing range if--

(1) It is not a primary (a 1.1A initiating) explosive or a forbidden explosive according to this subchapter;

(2) It is described as a Division 1.1 explosive (substance or article) and is packed, marked, labeled, described on shipping papers and is otherwise offered for transportation in conformance with the requirements of this subchapter applicable to Division 1.1;

(3) It is transported in a motor vehicle operated by the owner of the explosive; and

(4) It is accompanied by a person, in addition to the operator of the motor vehicle, who is qualified by training and experience to handle he explosive.

(f) Notwithstanding the requirements of paragraphs (b) and (d) of this section, the Associate Administrator for Hazardous Materials Safety may approve a new explosive on the basis of an approval issued for the explosive by the competent authority of a foreign government, or when examination of the explosive by a person approved by the Associate Administrator for Hazardous Materials Safety is impracticable, on the basis of reports of tests conducted by disinterested third parties, or may approve the transportation of an explosives sample for the purpose of examination by a person approved by he Associate Administrator for Hazardous Materials Safety.

(g) Notwithstanding the requirements of paragraph (b) of this section, an explosive may be transported under Secs. 171.11, 171.12, 171.12a or Sec. 176.11 of this subchapter without the approval of the Associate Administrator for Hazardous Materials Safety if the Associate Administrator for Hazardous Materials Safety has acknowledged, in writing, the acceptability of an approval issued by the competent authority of a foreign government pursuant to the provisions of the UN Recommendations, the ICAO Technical Instructions, the IMDG Code, or other national or international regulations based on the UN Recommendations. In such a case, a copy of the foreign competent authority approval, and a copy of the written acknowledgment of its acceptance must accompany each shipment of that explosive.

(h) The requirements of this section do not apply to cartridges, small arms which are:

(1) Not a forbidden explosive under Sec. 173.54 of this subchapter;

(2) Ammunition for rifle, pistol, or shotgun;

(3) Ammunition with inert projectile or blank ammunition; and

(4) Ammunition not exceeding 50 caliber for rifle or pistol cartridges or 8 gauge for shotgun shells.

Cartridges, small arms meeting the criteria of this paragraph (h) may be assigned a classification code of 1.4S by the manufacturer.

(i) If experience or other data indicate that the hazard of a material or a device containing an explosive composition is greater or less than indicated according to the definition and criteria specified 173.56, and 173.58 of this subchapter, the Associate Administrator for Hazardous Materials Safety may, following examination in accordance with paragraph (b) of this section, revise its classification or except the material or device from the requirements of this subchapter.

(j) Fireworks. Notwithstanding the requirements of paragraph (b) of this section, Division 1.3 and 1.4 fireworks may be classed and approved by the Associate Administrator for Hazardous Materials Safety without prior examination and offered for transportation if the following conditions are met:

(1) The fireworks are manufactured in accordance with the applicable requirements in APA Standard 87-1;

(2) A thermal stability test is conducted on the device by the BOE, the BOM, or the manufacturer. The test must be performed by maintaining the device, or a representative prototype of a large device such as a display shell, at a temperature of 75 deg.C (167 deg.F) for 48 consecutive hours. When a device contains more than one component, those components which could be in physical contact with each other in the finished device must be placed in contact with each other during the thermal stability test; and

(3) The manufacturer applies in writing to the Associate Administrator for Hazardous Materials Safety following the applicable requirements in APA Standard 87-1, and is notified in writing by the Associate Administrator for Hazardous Materials Safety that the fireworks have been classed, approved, and assigned an EX-number. Each application must be complete, including all relevant background data and copies of all applicable drawings, test results, and any other pertinent information on each device for which approval is being requested. The manufacturer must sign the application and certify that the device for which approval is requested conforms to APA Standard 87-1 and that the descriptions and technical information contained in the application are complete and accurate. If the application is denied, the manufacturer will be notified in writing of the reasons for the denial. The Associate Administrator for Hazardous Materials Safety may require that the fireworks be examined by an agency listed in paragraph (b)(1) of this section.

Sec. 173.57 Acceptance criteria for new explosives.

(a) Unless otherwise excepted, an explosive substance must be subjected to the Drop Weight Impact Sensitivity Test (Test Method 3(a)(I)), the Friction Sensitivity Test (Test Method 3(b)(iii)), the Thermal Stability Test (Test Method 3(c)) at 75 deg.C (167 deg.F) and the Small-Scale Burning Test (Test Method 3(d)(I)), each as described in the Explosive Test Manual (UN Recommendations on the Transport of Dangerous Goods, Tests and Criteria, Part I, Second Edition (see Sec. 171.7 of this subchapter). A substance is forbidden for transportation if any one of the following occurs:

(1) For a liquid, failure to pass the test criteria when tested in the Drop Weight Impact Sensitivity Test apparatus for liquids;

(2) For a solid, failure to pass the test criteria when tested in the Drop Weight Impact Sensitivity Test apparatus for solids;

(3) The substance has a friction sensitiveness equal to or greater than that of dry pentaerythrite tetranitrate (PETN) when tested in the Friction Sensitivity Test;

(4) The substance fails to pass the test criteria specified in the Thermal Stability Test at 75 deg.C (167 deg.F); or

(5) Explosion occurs when tested in the Small-Scale Burning Test.

(b) An explosive article, packaged or unpackaged, or a packaged explosive substance must be subjected to the Thermal Stability Test for Articles and Packaged Articles (Test method 4(a)(I)) and the Twelve Meter Drop Test (Test Method 4(b)(ii)), when appropriate, in the Explosive Test Manual. An article or packaged substance is forbidden for transportation if evidence of thermal instability or excessive impact sensitivity is found in those tests according to the criteria and methods of assessing results prescribed therein.

(c) Dynamite (explosive, blasting, type A) is forbidden for transportation if any of the following occurs:

(1) It does not have uniformly mixed with the absorbent material a satisfactory antacid in a quantity sufficient to have the acid neutralizing power of an amount of magnesium carbonate equal to one percent of the nitroglycerin or other liquid explosive ingredient;

(2) During the centrifuge test (Test Method D-2, in appendix D to this part) or the compression test (Test Method D-3 in appendix D to this part), a non-gelatin dynamite

loses more than 3 percent by weight of the liquid explosive or a gelatin dynamite loses more than 10 percent by weight of the liquid explosive; or

(3) During the leakage test (Test Method D-1 in appendix D to this part), there is any loss of liquid.

Sec. 173.58 Assignment of class and division for new explosives.

(a) Division 1.1., 1.2., 1.3., and 1.4 explosives. In addition to the test prescribed in Sec. 173.57 of this subchapter, a substance or article in these divisions must be subjected to Test Methods 6(a), 6(b), and 6(c), as described in the Explosive Test Manual, for assignment to an appropriate division. The criteria for assignment of class and division are as follows:

(1) Division 1.1 if the major hazard is mass explosion;

(2) Division 1.2 if the major hazard is dangerous projections;

(3) Division 1.3 if the major hazard is radiant heat or violent burning, or both, but there is no blast or projection hazard;

(4) Division 1.4 if there is a small hazard with no mass explosion and no projection of fragments of appreciable size or range;

(5) Division 1.4 Compatibility Group S (1.4S) if the hazardous effects are confined within the package or the blast and projection effects do not significantly hinder emergency response efforts; or

(6) Not in the explosive class if the substance or article does not have significant explosive hazard or if the effects of explosion are completely confined within the article.

(b) Division 1.5 explosive. Except for ANFO, a substance that has been examined in accordance with the provisions Sec. 173.57(a) of this subchapter, must be subjected to the following additional tests: Cap Sensitivity Test, Princess Incendiary Spark Test, DDT Test, and External Fire Test, each as described in the Explosive Test Manual. A material may not be classed as a Division 1.5 explosive if any of the following occurs:

(1) Detonation occurs in the Cap Sensitivity Test (Test Method 5(a));

(2) Detonation occurs in the DDT Test (Test Method 5(b)(ii));

(3) An explosion, evidenced by a loud noise and projection of fragments, occurs in the External Fire Test (Test Method 5(c), or

(4) Ignition or explosion occurs in the Princess Incendiary Spark est (Test Method 5(d)).

(c) Division 1.6 explosive.

(1) In order to be classed as a 1.6 explosive, an article must pass all of the following tests, as prescribed in the Explosive Test Manual:

(I) The 1.6 Article External Fire Test;

(ii) The 1.6 Article Slow Cook-off Test;

(iii) The 1.6 Article Propagation Test; and

(iv) The 1.6 Article Bullet Impact Test.

(2) A substance intended for use as the explosive load in an article of Division 1.6 must be an extremely insensitive detonating substance (EIDS). In order to determine if a substance is an EIDS, it must be subjected to the tests in paragraphs (c)(2)(I) through (c)(2)(x) of this section, which are described in the Explosive Test Manual. The substance must be tested in the form (i.e., composition, granulation, density, etc.) in which it is to be used in the article. A substance is not an EIDS if it fails any of the following tests:

(I) The Drop Weight Impact Sensitivity Test;
(ii) The Friction Sensitivity Test;
(iii) The Thermal Sensitivity Test at 75 deg.C (167 deg.F);
(iv) The Small Scale Burning Test;
(v) The EIDS Cap Test;
(vi) The EIDS Gap Test;
(vii) The Susan Test;
(viii) The EIDS Bullet Impact Test;
(ix) The EIDS External Fire Test; and
(x) The EIDS Slow Cook-off Test.

(d) The Associate Administrator for Hazardous Materials Safety may test(s) identified in Secs. 173.57 and 173.58 of this subchapter, or require additional testing, if appropriate. In addition, the Associate Administrator for Hazardous Materials Safety may limit the quantity of explosive in a device.

(e) Each explosive is assigned a compatibility group letter by the Associate Administrator for Hazardous Materials Safety based on the criteria prescribed in Sec. 173.52(b) of this subchapter.

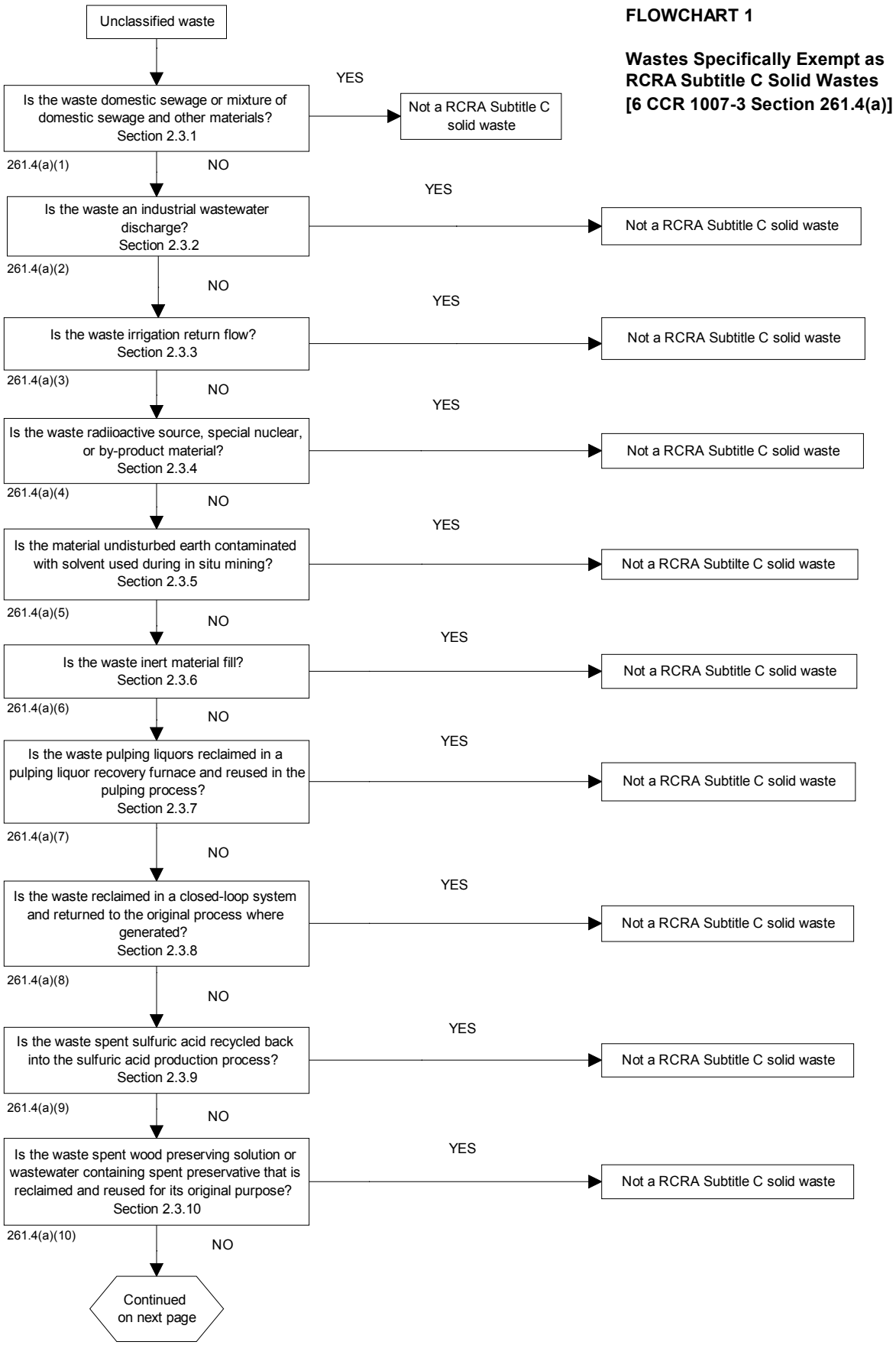
APPENDIX F Toxicity Characteristic Constituents And Regulatory Levels

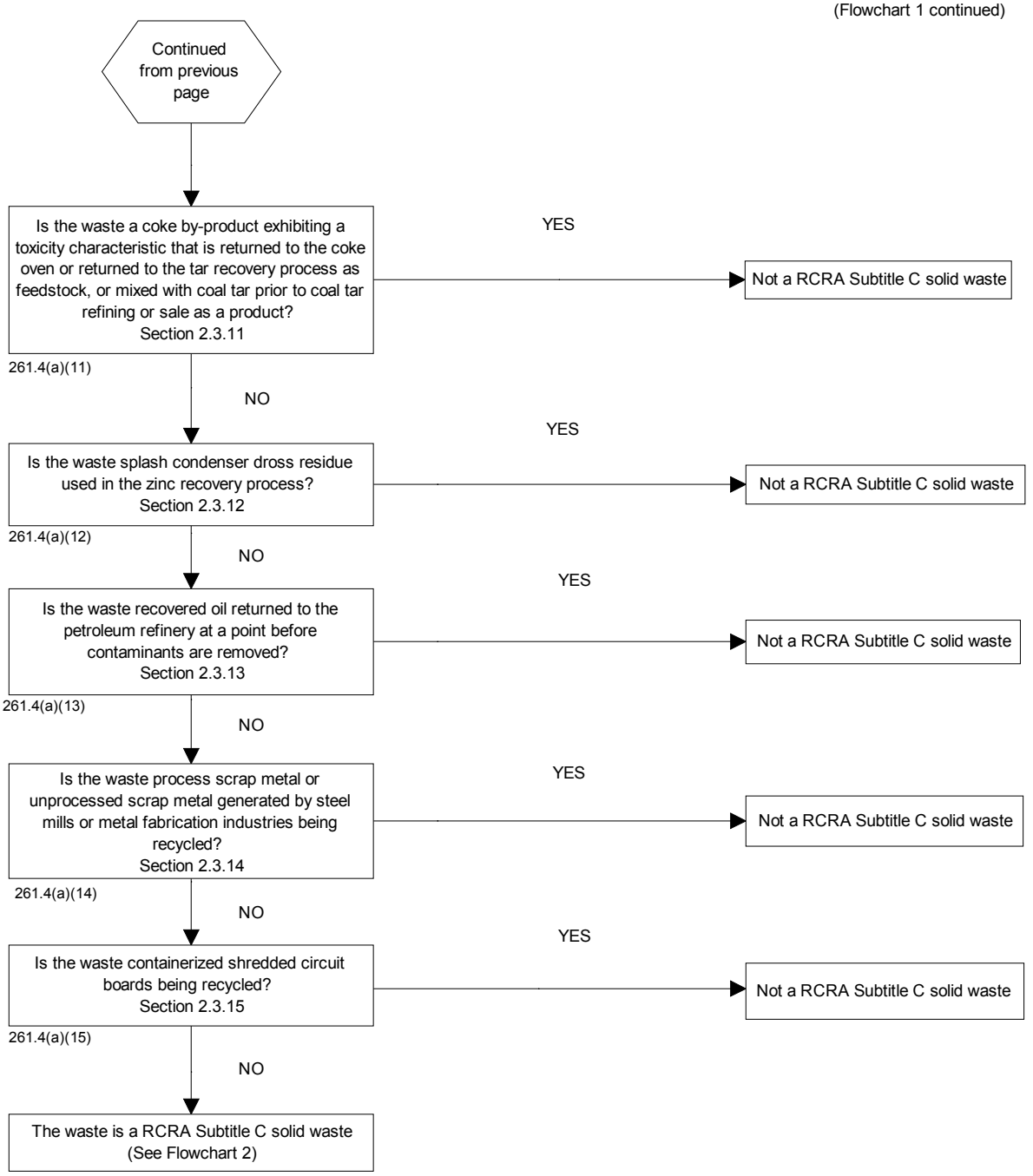
Waste Code	Contaminants	Maximum Concentration Level (MCL) (mg/l)
D004	Arsenic	5.0
D005	Barium	100.0
D018	Benzene	0.5
D006	Cadmium	1.0
D019	Carbon tetrachloride	0.5
D020	Chlordane	0.03
D021	Chlorobenzene	100.0
D022	Chloroform	6.0
D007	Chromium	5.0
D023	o-Cresol*	200.0
D024	m-Cresol*	200.0
D025	p-Cresol*	200.0
D026	Total Cresols*	200.0
D016	2,4-D	10.0
D027	1,4-Dichlorobenzene	7.5
D028	1,2-Dichloroethane	0.5
D029	1,1-Dichloroethylene	0.7
D030	2,4-Dinitrotoluene	0.13
D012	Endrin	0.02
D031	Heptachlor (and its epoxide)	0.008
D032	Hexachlorobenzene	0.13
D033	Hexachlorobutadiene	0.5
D034	Hexachloroethane	3.0
D008	Lead	5.0
D013	Lindane	0.4
D009	Mercury	0.2
D014	Methoxychlor	10.0
D035	Methyl ethyl ketone	200.0
D036	Nitrobenzene	2.0
D037	Pentachlorophenol	100.0
D038	Pyridine	5.0
D010	Selenium	1.0
D011	Silver	5.0
D039	Tetrachloroethylene	0.7
D015	Toxaphene	0.5
D040	Trichloroethylene	0.5
D041	2,4,5-Trichlorophenol	400.0
D042	2,4,6-Trichlorophenol	2.0
D017	2,4,5-TP (Silvex)	1.0
D043	Vinyl chloride	0.2

*If o-, m-, and p-cresols cannot be individually measured, the regulatory level for total cresols is used.

FLOWCHART 1

Wastes Specifically Exempt as RCRA Subtitle C Solid Wastes [6 CCR 1007-3 Section 261.4(a)]





Key

Is the waste an industrial wastewater discharge?
Section 2.3.2

Refers to the "CDPHE Solid Waste Definition and Solid and Hazardous Waste Exclusions Guidance Document"

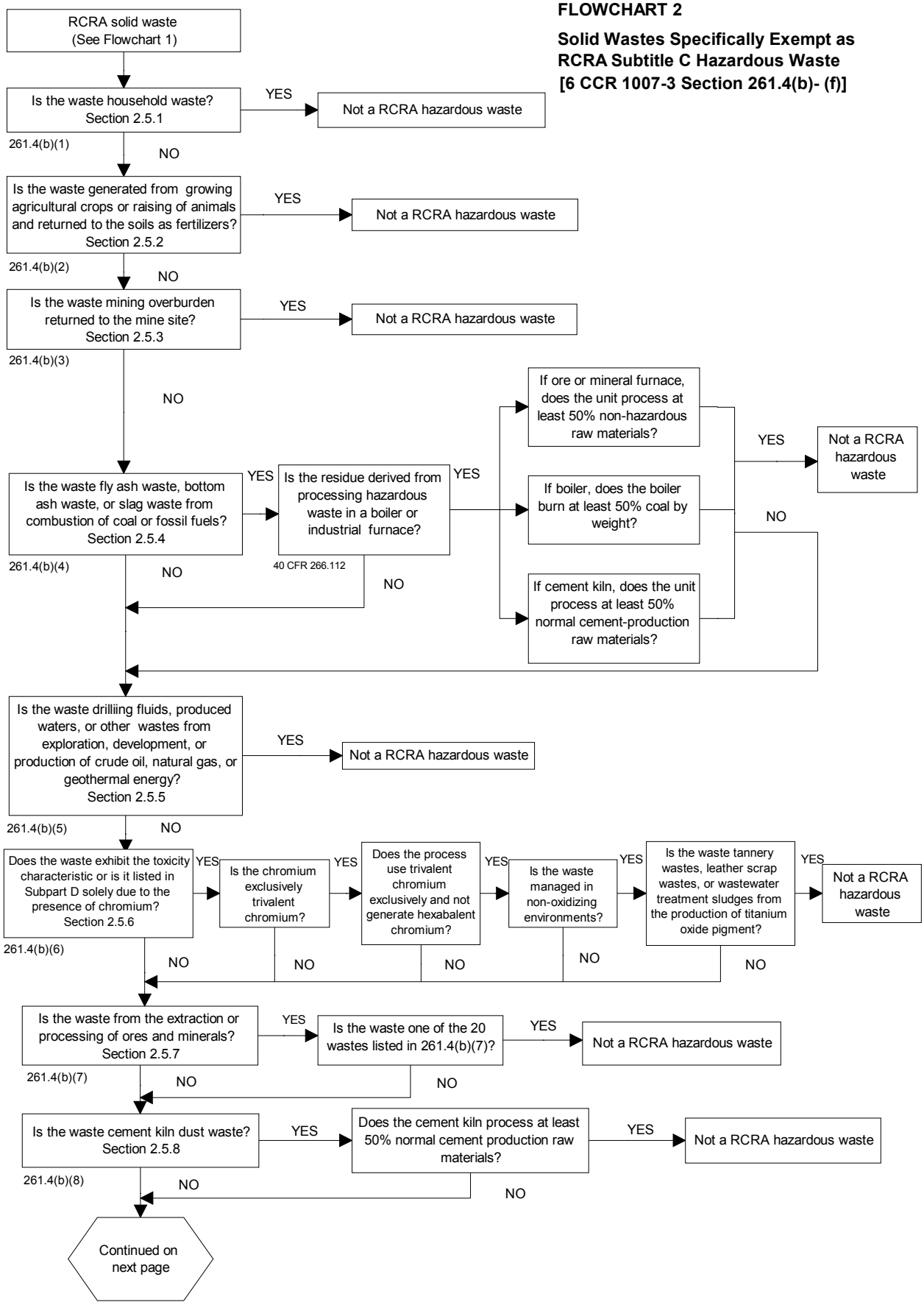
261.4(a)(2)

Refers to the Colorado Hazardous Waste Regulations 6 CCR 1007-3

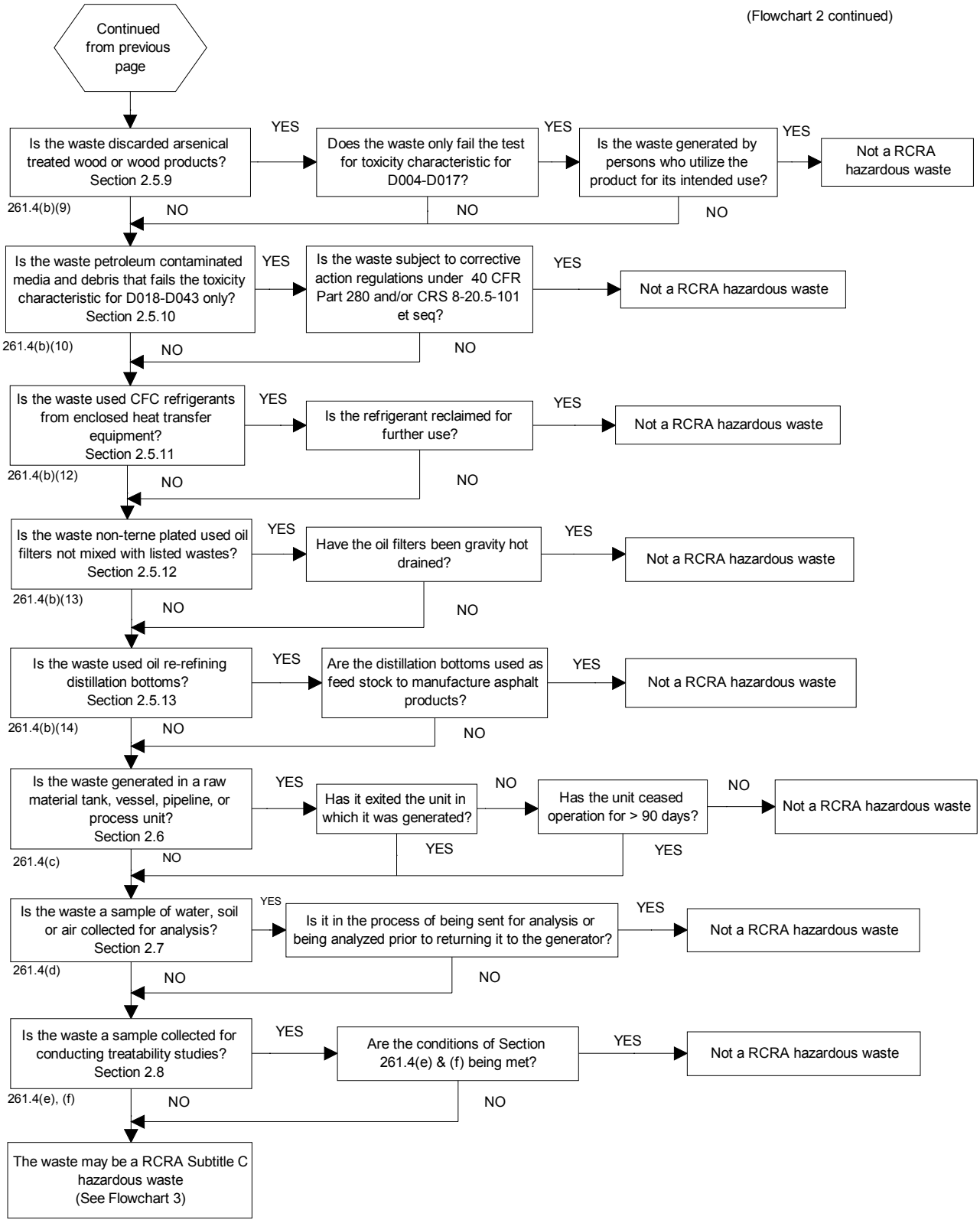
Note: Wastes that are not regulated as RCRA Subtitle C solid or hazardous wastes may be regulated under other statutes and/or regulations such as the Colorado Solid Waste Regulations, Colorado Water Quality Control Regulations, Colorado Radiation Control Regulations, Atomic Energy Act, and Clean Water Act.

FLOWCHART 2

Solid Wastes Specifically Exempt as RCRA Subtitle C Hazardous Waste [6 CCR 1007-3 Section 261.4(b)- (f)]



(Flowchart 2 continued)



Key

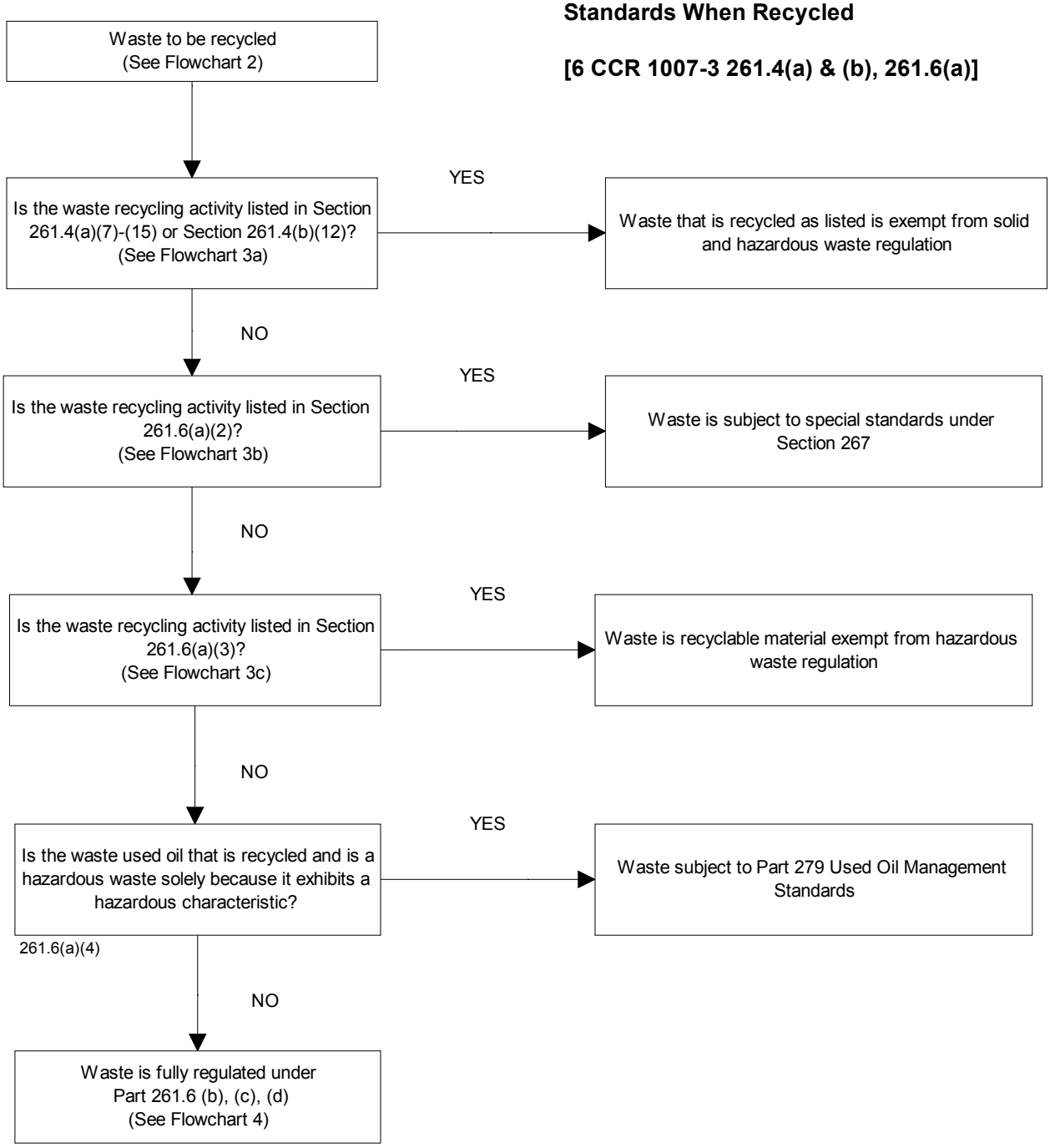
Is the waste cement kiln dust waste? **Section 2.5.8** — Refers to the "CDPHE Solid Waste Definition and Solid and Hazardous Waste Exclusions Guidance Document"

261.4(b)(8) — Refers to the Colorado Hazardous Waste Regulations 6 CCR 1007-3 unless otherwise noted

FLOWCHART 3

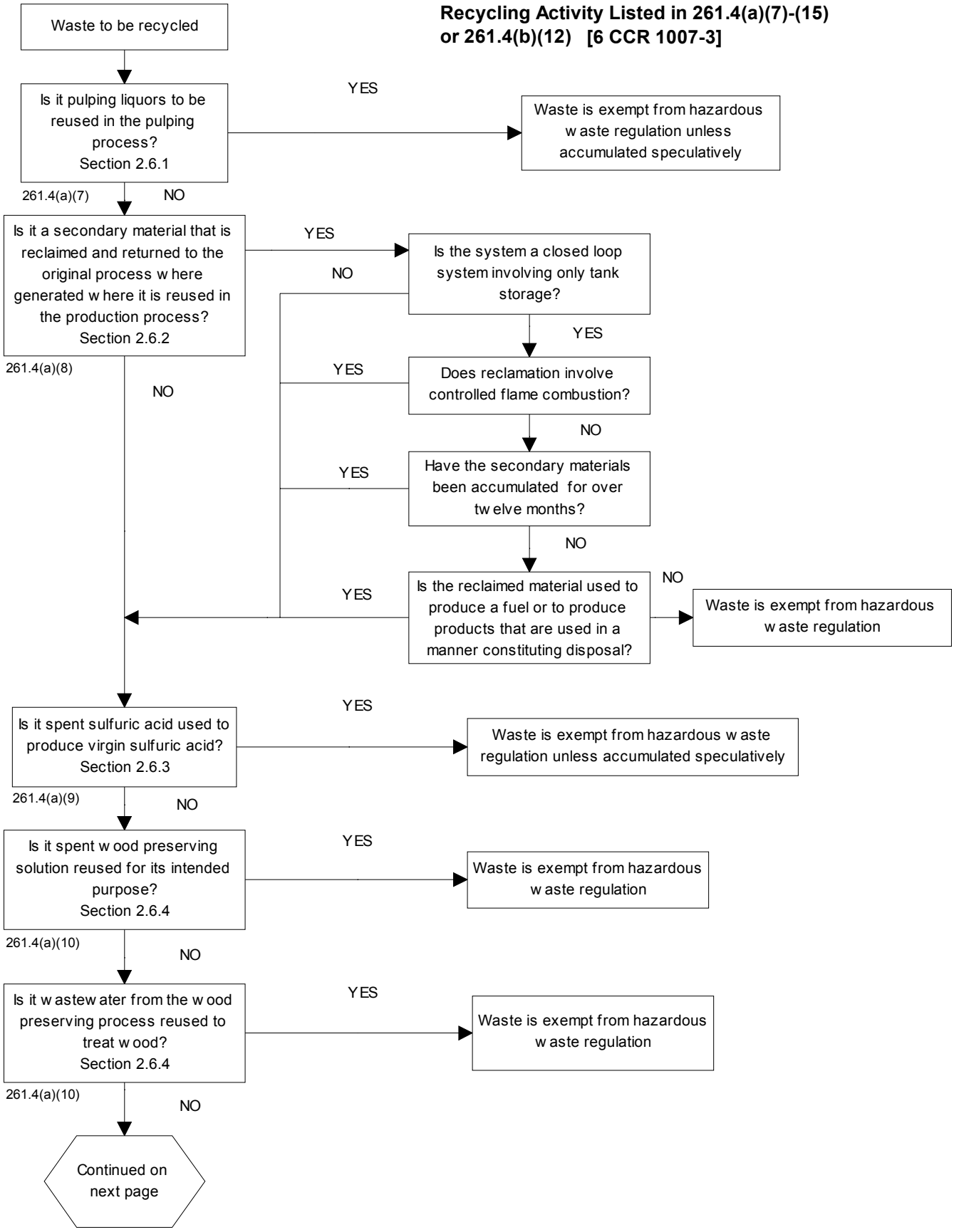
Solid Wastes Specifically Exempt as Hazardous Wastes or Subject to Special Standards When Recycled

[6 CCR 1007-3 261.4(a) & (b), 261.6(a)]

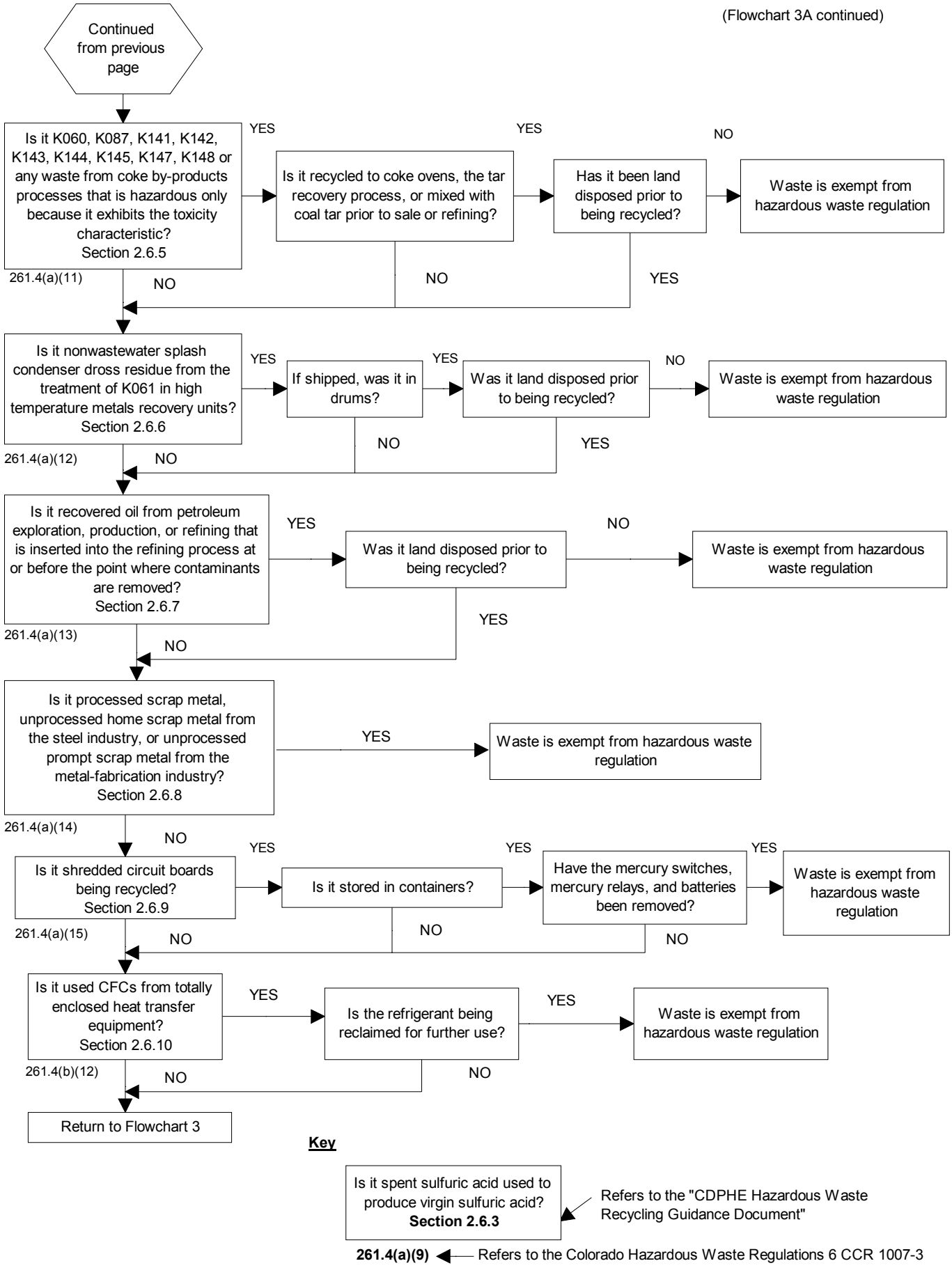


FLOWCHART 3A

Recycling Activity Listed in 261.4(a)(7)-(15) or 261.4(b)(12) [6 CCR 1007-3]

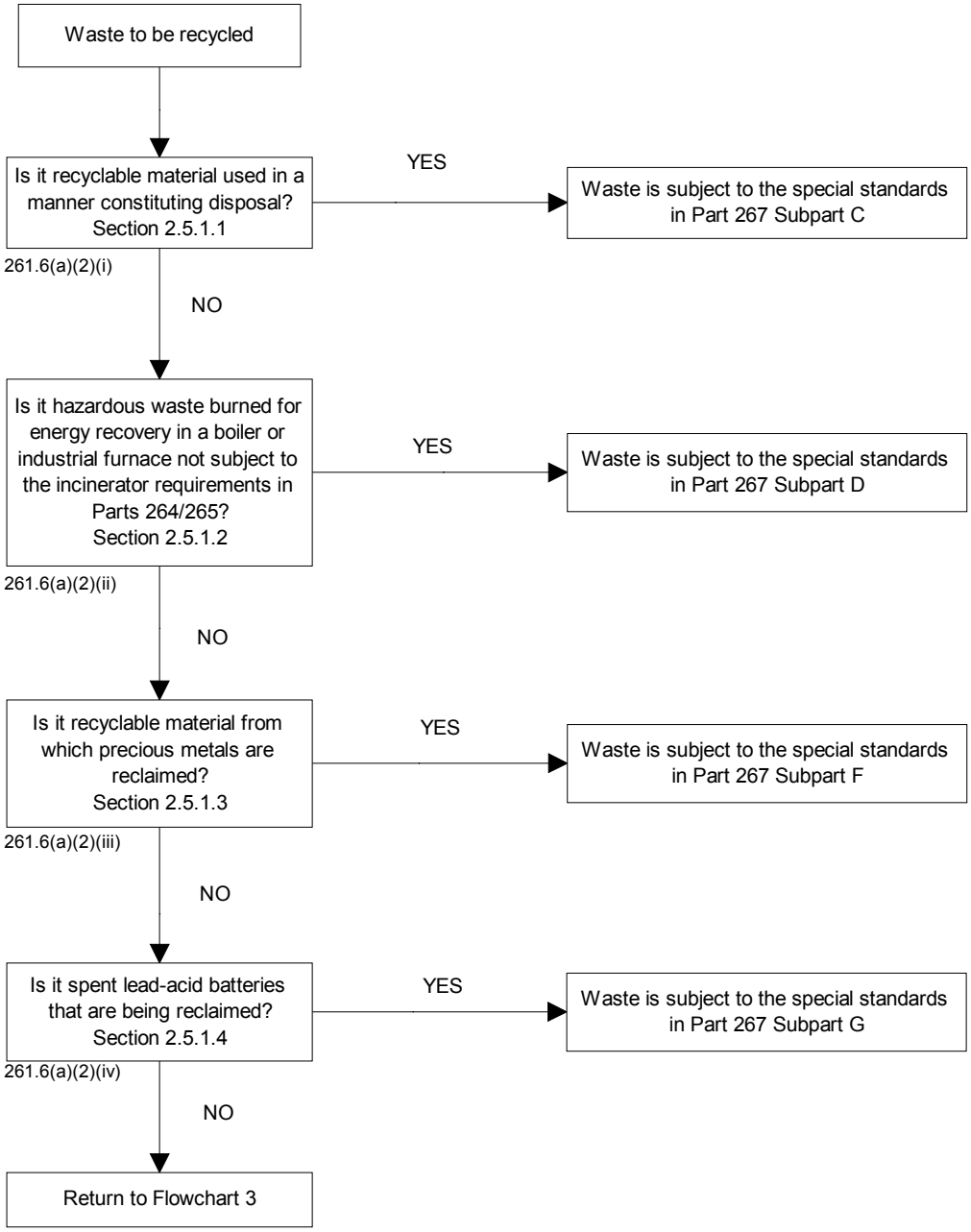


(Flowchart 3A continued)

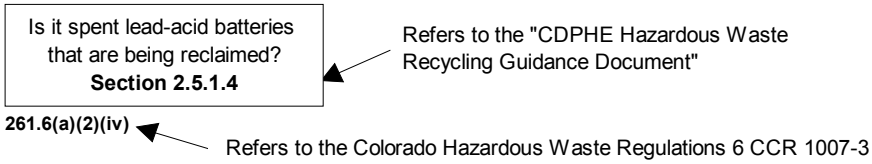


FLOWCHART 3B

Recycling Activity Listed in 261.6(a)(2)
[6 CCR 1007-3]

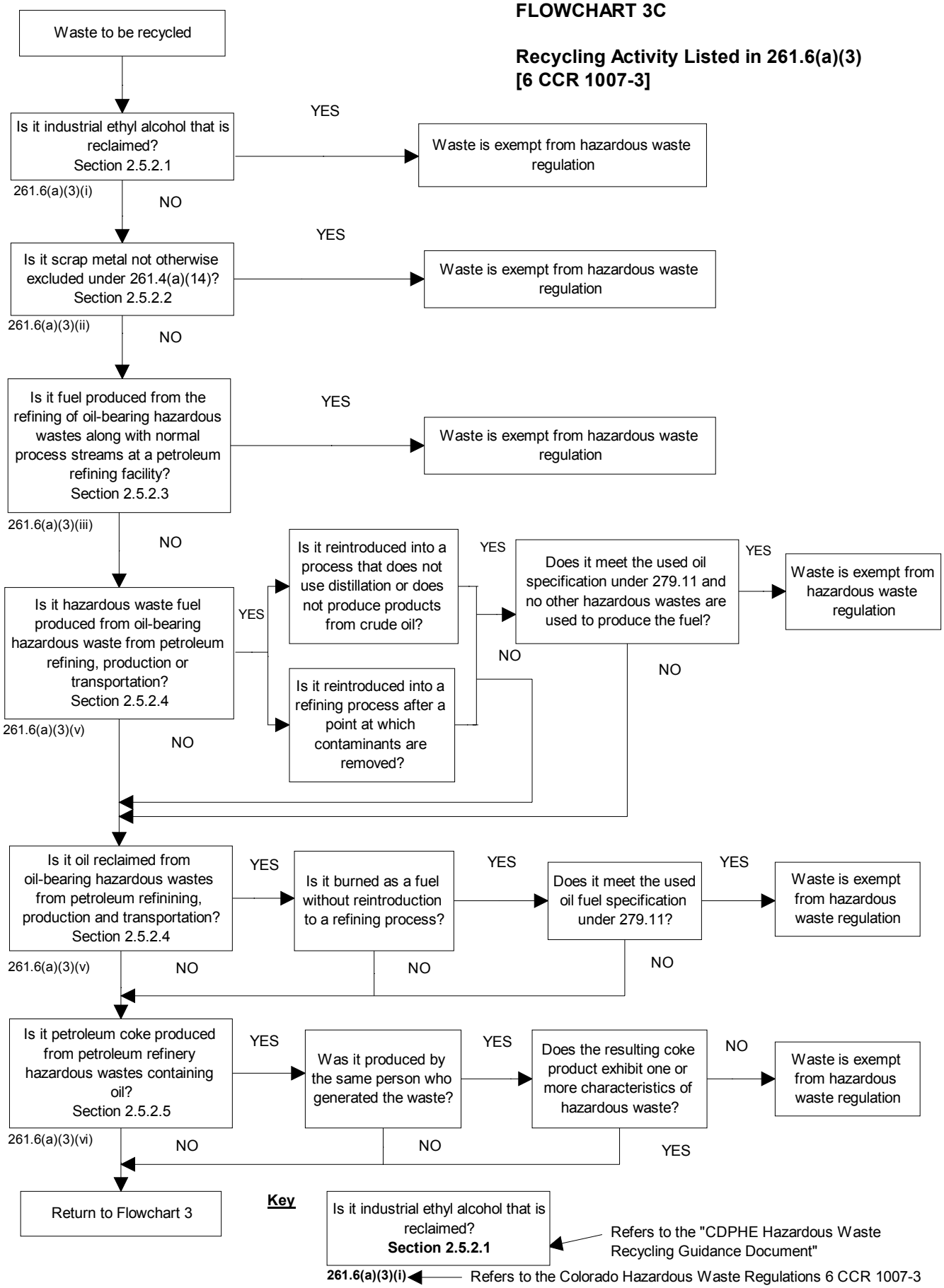


Key



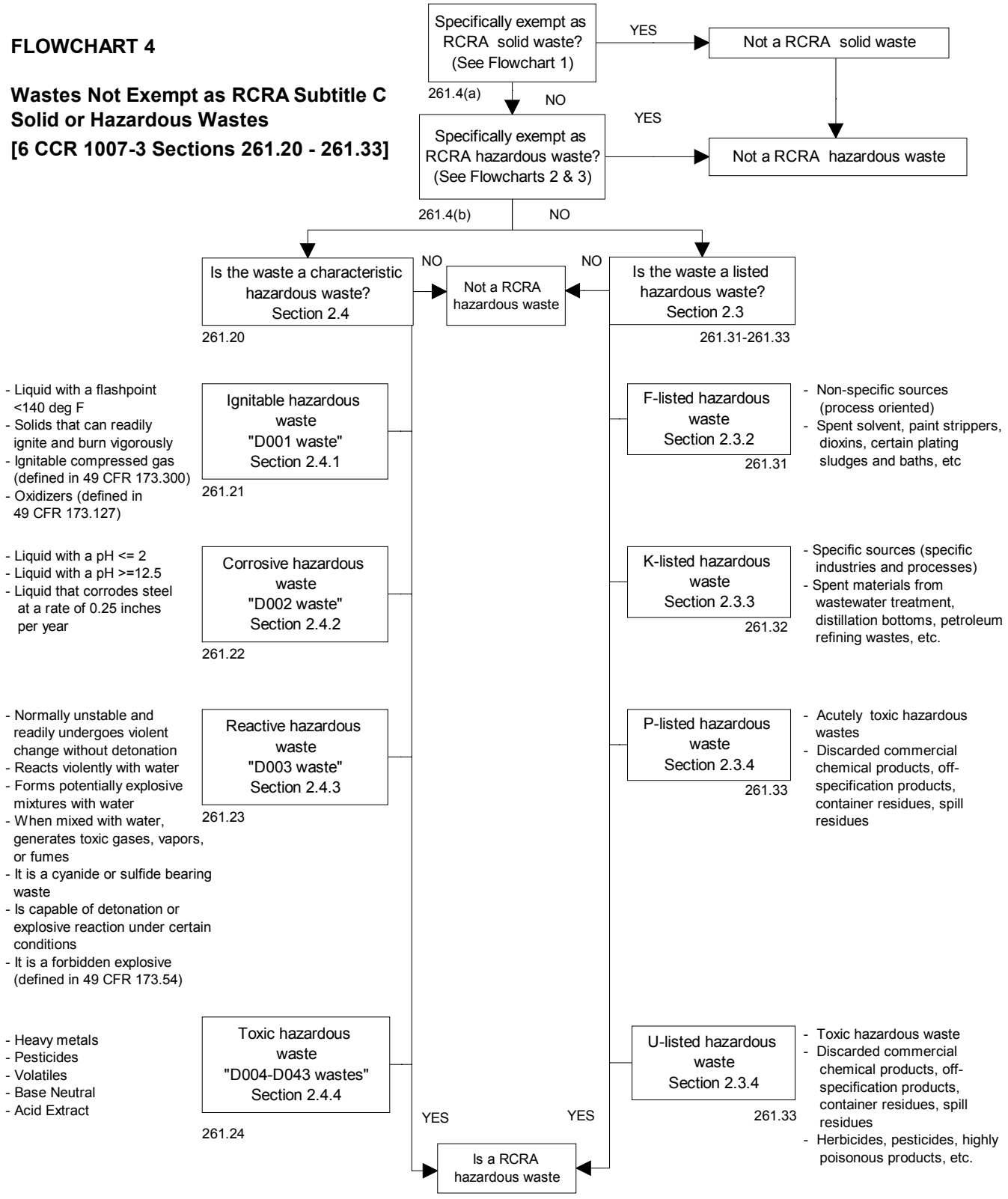
FLOWCHART 3C

Recycling Activity Listed in 261.6(a)(3)
[6 CCR 1007-3]



FLOWCHART 4

Wastes Not Exempt as RCRA Subtitle C Solid or Hazardous Wastes [6 CCR 1007-3 Sections 261.20 - 261.33]



Key

Is the waste a characteristic hazardous waste? **Section 2.4** ← Refers to the "CDPHE Hazardous Waste Identification Guidance Document"

261.20 ← Refers to the Colorado Hazardous Waste Regulations 6 CCR 1007-3

Note: More than one waste code may apply to a single waste.