
**TREATMENT OF HAZARDOUS WASTE
BY GENERATORS
GUIDANCE DOCUMENT**



**Colorado Department
of Public Health
and Environment**

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Colorado Department of Public Health and Environment
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Purpose of this Guidance

This guidance is not a “how-to” manual for hazardous waste treatment and it must be understood that most treated wastes must still be disposed of in a permitted hazardous waste facility. This guidance is intended as general guidance for generators of hazardous waste to assist them in determining when they may treat their hazardous wastes and what requirements they must meet if they do. 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 provided in Section 5.0 of this document.

This guidance is not meant to modify or replace the regulations, which undergo periodic revisions. In the event of a conflict between this guidance and regulations, the regulations govern. 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. The Department reserves the right to act at variance with this guidance and to change it at any time.

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1.0 INTRODUCTION

In general, treatment of hazardous waste requires that a hazardous waste permit be received before treatment can be done. "Treatment" covers a broad spectrum of activities - almost anything that can be done to a hazardous waste prior to disposal. The regulatory definition states:

"Treatment" when used in connection with an operation involved in hazardous waste management, means any method, technique, or process, including neutralization or incineration, designed to change the physical, chemical, or biological character or composition of a hazardous waste, so as to neutralize such waste or to render such waste less hazardous, safer for transport, amenable for recovery or reuse, amenable for storage, or reduced in volume. [6 CCR 1007-3 Section 260.10]

In order to obtain a permit to treat hazardous waste, a facility is required to submit a comprehensive permit application covering all aspects of the design, operation and maintenance of the facility. Permits are written to address the type(s) of treatment that will occur and the waste streams that will be managed at the facility. The permit defines operating requirements and specific provisions that must be followed for each treatment process. The facility must comply with all conditions of their permit and must ensure proper operation and maintenance of the permitted treatment units. Depending on the level of complexity, it may take on the order of one to two years to obtain a hazardous waste permit due to the extensive level of review and public comment.

Under a limited set of circumstances, however, generators are allowed to treat their own hazardous wastes without first going through the complex regulatory process of getting a hazardous waste permit. The broadness of the definition of "treatment" creates many areas of confusion about when a hazardous waste treatment permit is required and when a particular activity is excepted from requiring a treatment permit.

Part of the confusion stems from the fact that there is a continuum from when a permit is definitely required to when a permit is definitely not required. Evaluating whether a hazardous waste treatment permit is required before a generator can treat their own hazardous wastes requires detailed process review and possibly reference to US 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 determining if your process requires a permit, you may request a written interpretation regarding the treatment of your waste by providing detailed process information to the Department at the address provided in Section 5.0 of this document.

This document is intended to be used as guidance to provide a brief description of the options available to generators of hazardous waste who are considering treating their own hazardous wastes. Unless otherwise noted, all regulatory citations in this document refer to the Colorado Hazardous Waste Regulations (6 CCR 1007-3 or "CHWR"). The information in this document is by no means a complete representation of the Colorado Department of Public Health and Environment's (the Department) 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 BEFORE YOU GET STARTED

2.1 Generators Must be Qualified to Conduct Treatment

This document is not a “how-to” manual for hazardous waste treatment and cannot address every treatment situation individually. There has to be some assumption that the generator “knows what he or she is doing” if they decide to treat their own hazardous waste. Generators must take responsibility in determining 1) under what circumstances they may treat their hazardous wastes, 2) their capacity and competence to safely treat the waste, 3) whether or not the treatment requires a hazardous waste permit, 4) what treatment standards they must meet and if the waste has a specified treatment technology, and 5) how they must manage the waste after treatment.

It also requires detailed understanding of the Land Disposal Restrictions (LDR) in CHWR Part 268. The land disposal restrictions require that a hazardous waste meet, or be treated to meet, specified standards before being disposed of on the land. In addition to prohibiting land disposal of wastes that do not meet treatment standards, the LDR program includes two other important prohibitions. One forbids the storage of wastes as a substitute for meeting the required treatment standards. The other prohibits the dilution of wastes as a substitute for legitimate treatment.

Just because a generator may legally be able to treat their hazardous waste without a permit doesn't necessarily mean that it's a good idea from an economic, safety and/or future liability standpoint. The decision to conduct generator treatment is not one that can be taken lightly.

2.2 Treated Wastes are Still Hazardous Wastes for Disposal Purposes

Confusion may also exist regarding what should be done with the waste after treatment. The Colorado solid waste regulations [6 CCR 1007-2] prohibit the disposal of hazardous wastes in Subtitle D municipal and industrial solid waste landfills, including wastes from conditionally exempt small quantity generators (CESQG). Therefore, even after treatment, most hazardous wastes cannot be disposed of in a municipal or industrial solid waste landfill and must still be disposed of in a permitted Subtitle C hazardous waste facility. Treatment is primarily to make this process safer and/or less expensive, not to remove the waste from hazardous waste regulation.

Under very limited circumstances, characteristic-only (not listed) wastes that have been successfully treated to remove the characteristic may be disposed of in a Subtitle D solid waste landfill because the treated waste is no longer considered to be hazardous waste. For the most part, these wastes must also be treated to remove the underlying hazardous constituents (UHCs) before disposal is allowed. Underlying hazardous constituents are constituents present in the waste that themselves don't cause the waste to be a hazardous waste, but may still be harmful to human health or the environment.

Listed hazardous wastes, treatment residues, and characteristic wastes that don't meet the narrow exclusion in the previous paragraph must be disposed of in a permitted Subtitle C hazardous waste facility after treatment.

2.3 Careful Planning is Required

Before conducting hazardous waste treatment, the generator should plan ahead to minimize potential hazards. The level of detail needed will vary based on the scale of the treatment process - treatment of larger quantities of waste and/or more toxic wastes will require greater detail in analyses and planning. Planning should include how employee exposures will be minimized, how

employees will be trained to conduct treatment activities safely, a description of the physical and chemical reactions that will occur during the process, the type(s) of waste resulting from the treatment process, standard operating procedures, safe operating limits, and what to do if these procedures fail. Treatment of hazardous waste generally requires preparation of a detailed waste analysis plan, possible modification of the facility's emergency response/contingency plans and additional recordkeeping.

If the generator decides to conduct onsite treatment of their waste, they must monitor the treatment process and continue to evaluate its safety and effectiveness. Employees will need to be trained or re-trained to deal with these processes and any changes to the processes. Each release or other unplanned incident should be fully investigated to identify and resolve the factors leading to the event prior to restarting the treatment process. If the factors leading to the event cannot be resolved, the generator should cease onsite treatment of the waste stream.

The Colorado Department of Public Health and Environment (the Department) conducts extensive reviews of all materials submitted if a permit is required to treat hazardous wastes. If a hazardous waste treatment permit is not required, however, the generator will largely be on their own to ensure that they have thoroughly evaluated their processes and have planned for the safe and efficient treatment of their waste stream.

3.0 EXCEPTIONS TO THE PERMIT REQUIREMENT

The Colorado Hazardous Waste Regulations (CHWR) provide specific limited exceptions to the requirement for obtaining a hazardous waste treatment permit in CHWR Sections 100.10, 261.4, 261.5, 261.6, 267, and Part 273. It should be noted that other regulations generally apply to these situations and permits may be required by other regulatory programs. The exceptions from the hazardous waste treatment permit requirements include:

- Generators adding absorbent material to waste in a container and generators adding waste to absorbent material in a container.
- Owners and operators of elementary neutralization units.
- Owners and operators of wastewater treatment units.
- Owners and operators of totally enclosed treatment facilities.
- Conditionally exempt small quantity generators treating their own hazardous wastes and persons who own or operate facilities solely for the treatment of hazardous waste from conditionally exempt small quantity generators.
- Persons recycling certain hazardous wastes in specific ways.
- Persons conducting treatability studies to determine the appropriateness of potential treatment processes.
- Persons managing batteries, pesticides, mercury-containing devices, mercury-containing lamps, electronic devices and aerosol cans under the Universal Waste Rule of CHWR Part 273.

3.1 Adding Absorbent to a Container [CHWR Section 100.10(a)(9)]

Generators that add absorbent material to waste in a container and those that add waste to absorbent material in a container are exempt from obtaining a hazardous waste treatment permit as long as certain conditions are met. First of all, the container must be in good condition and the waste must be compatible with both the container and the type of absorbent used. The generator must take

precautions to prevent dangerous reactions when managing ignitable, reactive, or incompatible wastes. Although the timing of when the waste or absorbent is added is clearly stated in the rule (*at the time waste is first placed in the container*), the Department doesn't place a lot of emphasis on when these actions occur. While it is certainly preferable that absorbent be added when the waste is first placed in the container in order to minimize opening of the container, the Department recognizes that the use of absorbents may not be needed immediately. Absorbent may be added to a container to absorb residual liquids that may have phase-separated while being accumulated onsite or results from condensation. For example, oil-based paint often separates into the solid portion at the bottom of the container with the liquid fraction at the top. Absorbents are frequently added to take up the liquids and make the waste more acceptable for disposal. This exemption is not intended to address a situation where a generator wants to absorb bulk liquid wastes. Adding absorbent to an entire drum of liquid waste would not be covered by this exemption. The exemption also applies only to containerized wastes, not to waste in tanks.

Hazardous wastes with absorbents added must meet the applicable Land Disposal Restrictions of CHWR Part 268 and be disposed of in a permitted Subtitle C hazardous waste facility. This type of physical treatment is used to solidify and absorb residual free liquids most often to make the waste safer for transportation and more acceptable for land disposal, not to chemically fix or change the character of the waste.

3.2 Elementary Neutralization [CHWR Section 100.10(a)(6)]

The permit exemption for elementary neutralization units is very narrow in scope and is limited to wastes that are **only** hazardous for the corrosivity characteristic or are listed due solely to corrosivity (there are currently no such listed wastes). A solid waste exhibits the characteristic of corrosivity if a representative sample of the waste is either aqueous and has a pH less than 2 or greater than 12.5, or it is any liquid that corrodes steel at a rate greater than 0.250 inches per year at a temperature of 130 degrees Fahrenheit [CHWR Section 261.22].

“Elementary Neutralization unit” means a device which:

(1) Is used for neutralizing wastes that are hazardous only because they exhibit the corrosivity characteristic defined in § 261.22, or are listed in Subpart D of Part 261 of these regulations only for this reason; and

(2) Meets the definition of tank, tank system, container, transport vehicle, or vessel in § 260.10 of these regulations. [CHWR Section 260.10]

This exemption does not apply to wastes that exhibit any of the other characteristics of ignitability, reactivity, or toxicity, or to wastes that are listed in CHWR Part 261 Subpart D for any reason besides just corrosivity. Don't let the terms acid or caustic mislead you – many acidic and caustic wastes are not eligible for this exemption. For example, neutralization of chromic acid would not be covered by this exemption because chromic acid also fails the toxicity test for chromium (D007). Similarly, unused hydrofluoric acid is listed as a hazardous waste (U134) due to corrosivity and toxicity and therefore would not be covered by this exemption.

The Land Disposal Restriction (LDR) treatment standard for corrosive wastes requires removal of the corrosivity characteristic by deactivation (i.e., neutralization) and treatment of the underlying hazardous constituents (UHC) to meet the universal treatment standards [CHWR Section 268.40].

Underlying hazardous constituents are constituents present in the waste that themselves don't cause the waste to be a hazardous waste, but may still be harmful to human health or the environment.

Corrosive-only hazardous wastes that have been successfully treated to remove the characteristic and that are treated for all underlying hazardous constituents can be disposed of as nonhazardous waste in a Subtitle D municipal or industrial solid waste landfill or Class I nonhazardous waste injection well. These wastes will require further treatment (solidification) if they are to be sent to for disposal in a landfill because it is not permissible to dispose of wastes containing free liquids in a landfill. If these wastes have been successfully treated to remove the characteristic but are not treated for the underlying hazardous constituents, they must be sent to a permitted hazardous waste facility for further treatment.

There is a footnote to the LDR treatment standard for corrosive wastes that indicates that these wastes are no longer subject to the LDR treatment standards if they have been rendered nonhazardous (deactivated) and then subsequently managed in a Clean Water Act system such as a publicly owned treatment works (POTW) [CHWR sections 268.1(c)(4) and 268.40]. If the generator discharges their neutralized waste to a permitted wastewater treatment system, they do not need to treat the underlying hazardous constituents prior to discharge. But even though additional treatment may not be required under LDR, the wastewater treatment plant will likely have requirements for pretreatment before they will accept the waste.

Neutralization is an exothermic reaction (generates heat), so extra caution should always be taken when conducting elementary neutralization. Although dilution is generally prohibited, an exception is made for certain wastes that will be discharged under the Clean Water Act. In this case, it is acceptable to dilute corrosive wastes before neutralization and subsequent discharge to a publicly owned wastewater treatment plant to reduce the intensity of the exothermic reaction.

If the corrosive waste is stored in containers prior to management in an elementary neutralization unit, then the entire volume of waste stored outside of the elementary neutralization unit would have to be counted toward the generator's monthly generator status. Corrosive wastes that are managed in an elementary neutralization unit within 24 hours of waste generation are not counted towards the generator's monthly hazardous waste generation volume. The regulations don't require that the waste is actually neutralized within 24 hours, only that it is managed in the elementary neutralization system within 24 hours. Typically, this is only allowed when the elementary neutralization system is a tank or tank system. Residues generated during treatment of a corrosive waste are considered newly generated wastes and must be evaluated to determine if they are hazardous waste.

Generators that treat corrosive-only hazardous waste in an elementary neutralization unit must submit a one-time notification and certification to the Department, with a copy kept in the generator's files for at least three years from the date that the waste was last treated onsite. The notification must be updated on an annual basis if the process or operation generating the waste changes. The notification must include a description of the waste as initially generated including all applicable waste codes, treatability groups, and underlying hazardous constituents (UHC). If all UHCs were successfully treated and monitored, there is no need to list them on the notification. The certification must be signed by the facility's authorized representative and must certify either that the waste meets the universal treatment standards or that further treatment is necessary to meet these standards [CHWR Section 268.7]. If further treatment is necessary, a copy of the notification

must accompany the initial shipment to the treatment facility. Adequate documentation of the hazardous waste determination must also be maintained in the generator's files.

3.3 Wastewater Treatment Units [CHWR Section 100.10(a)(6)]

The Colorado Hazardous Waste Regulations provide an exemption from permitting requirements for the treatment of hazardous wastewater in a wastewater treatment unit (WWTU) if discharge is regulated under the Clean Water Act (CWA).

“Wastewater treatment unit” means a device which:

(1) Is part of a wastewater treatment facility that is subject to regulation under either Section 402 or Section 307(b) of the Clean Water Act; and

(2) Receives and treats or stores an influent wastewater that is a hazardous waste as defined in § 261.3 of these regulations, or that generates and accumulates a wastewater treatment sludge that is a hazardous waste as defined in § 261.3 of these regulations; and

(3) Meets the definition of tank or tank system in § 260.10 of these regulations.
[CHWR Section 260.10]

All three of these requirements must be met for a unit to qualify for the wastewater treatment unit exemption. The first requirement limits the exemption to units that are part of a wastewater treatment facility subject to regulation under a National Pollution Discharge Elimination System (NPDES) permit, a Colorado Discharge Permit System (CDPS) permit issued by the State Water Quality Control Division, or that are part of a wastewater treatment facility subject to regulation under the Clean Water Act pretreatment requirements. Facilities with wastewater treatment units that do not have a discharge (e.g., wastewater evaporators) should obtain a zero discharge permit from their publicly owned wastewater treatment plant to ensure that their treatment unit is exempt under these provisions.

The second requirement allows facilities eligible for the exclusion to receive, treat or store a wastewater, or generate, accumulate, treat and store a wastewater treatment sludge that is a hazardous waste. The wastewater treatment unit may not receive a wastewater treatment unit sludge from offsite that is hazardous waste unless the facility has interim status or has received a hazardous waste permit for that activity. “Wastewater” is interpreted to include wastes that are predominantly water as opposed to concentrated chemical solutions or non-aqueous wastes.

The third requirement is that the unit must meet the definition of a tank or tank system in CHWR Section 260.10. “Tank” means a stationary device designed to contain hazardous waste, while “tank system” means a hazardous waste storage or treatment tank and its associated ancillary equipment and containment system.

Tanks that manage wastewater or wastewater treatment sludge must be a dedicated part of the wastewater treatment unit to be included in the exemption. The wastewater treatment unit exemption also generally includes sludge dryers and filter presses that are integral to the wastewater treatment unit, even though they don't typically look like tanks. The sludge dryer or filter press does not necessarily have to be attached to the wastewater treatment unit, but should be in close

proximity to the treatment unit (i.e., be part of the wastewater treatment system). The Department will not allow filter presses or sludge driers that are inherently unsafe, that pose a threat to human health or the environment from uncontrolled releases, or that are combustion units.

The wastewater treatment unit exemption applies to the unit itself; the waste is still considered to be hazardous waste throughout the process. Hazardous wastewaters managed in a wastewater treatment unit within 24-hours of waste generation are not counted towards the generator's monthly hazardous waste generation volume and the treatment unit is not subject to regulation as a hazardous waste tank. The regulations don't require that the waste actually be treated within 24-hours, only that it is managed in the wastewater treatment unit within 24-hours. Tanks that are not integral to the wastewater treatment unit and containers that are used to store hazardous wastewaters prior to management in a wastewater treatment unit are subject to tank and container management standards and other applicable generator requirements. Wastes stored in such tanks or containers must be counted towards the generator's monthly generation volume.

Most wastewater treatment units generate sludge. Sludge that is determined to be hazardous waste, and wastewater treatment unit effluent that is unacceptable for discharge under the Clean Water Act provisions, must be managed and disposed of as hazardous waste. Sludge resulting from treatment of listed hazardous waste remains a listed waste after treatment and must be disposed of in a permitted hazardous waste facility. Sludge produced from the treatment of a characteristic-only waste that does not exhibit characteristics of a hazardous waste after treatment would no longer be a hazardous waste and may be disposed of as a non-hazardous solid waste as long as the sludge meets the land disposal restrictions (including treatment of underlying hazardous constituents, if applicable) and all free liquids have been removed.

Treated wastewater effluent that is discharged in compliance with a National Pollutant Discharge Elimination System (NPDES) permit is no longer regulated as a hazardous waste, however, because the discharge is regulated under the Clean Water Act. Waste that discharges to a publicly owned treatment works (POTW) is a hazardous waste until it mixes with domestic sewage. In most cases, this occurs when the waste enters the sewer line owned by the wastewater treatment plant. This distinction only becomes important if the waste leaks out of the sewer pipe prior to mixing with domestic sewage. The waste generator would then be required to repair the sewer line and initiate appropriate corrective measures. Similarly, if the wastewater treatment unit is found to be leaking to the environment, it is considered to be illegal disposal of hazardous waste and the waste generator would be required to take corrective action.

Generators that are treating hazardous wastewaters in a wastewater treatment unit and subsequently discharging the treated wastewater to a publicly owned treatment plant must maintain a one-time written land disposal restriction (LDR) notice in the facility file that includes a description of how the waste was generated, all hazardous waste codes applicable to the waste as generated, a description of how the waste was treated to render it non-hazardous, and a description of the final disposition of the waste [CHWR Section 268.7(7)]. A copy of this notification must be kept in the site files for at least three years after the date that the waste was last treated onsite

3.4 Totally Enclosed Treatment Facilities [CHWR Section 100.10(a)(5)]

This very narrow exemption from the hazardous waste permitting requirements applies where treatment occurs as part of an entirely piped process or other comparable enclosed means of conveyance, meaning the process does not require any human intervention to occur and in which

there are no outlets to ambient air, which is rare. Totally enclosed treatment facilities are mostly seen in chemical production processes.

“Totally enclosed treatment facility” means a facility for the treatment of hazardous waste which is directly connected to an industrial production process and which is constructed and operated in a manner which prevents the release of any hazardous waste or any constituent thereof into the environment during treatment. An example is a pipe in which waste acid is neutralized. [CHWR Section 260.10]

As used in this definition, “facility” refers to the treatment unit and not to the whole building or site where the treatment occurs. A totally enclosed treatment facility is, for all intents and purposes, limited to totally enclosed piping or tanks where nothing can leak, spill or be emitted, even during process upset conditions. The only thing released is the treated waste at the end of the unit.

A totally enclosed treatment facility is not the same as a closed-loop recycling unit. Although both types of units require that the entire process be completed as part of a piped process requiring no human intervention, closed-loop recycling units may have openings to ambient air such as air vents. For more information on closed-loop recycling, refer to Colorado’s “Hazardous Waste Recycling Guidance Document.”

3.5 Conditionally Exempt Small Quantity Generators [CHWR Sections 100.10(a)(3) and 261.5]

A conditionally exempt small quantity generator of hazardous waste (CESQG) is one that generates no more than 100 kilograms (about 220 pounds or 25 gallons) of hazardous waste and no more than 1 kilogram (about 2.2 pounds) of acutely hazardous waste in any calendar month. A conditionally exempt small quantity generator can accumulate up to 1000 kilograms of hazardous waste and no more than 1 kilogram of acutely hazardous waste on site at any one time. These limits are not average amounts of waste generated or stored, but are maximum amounts generated in any calendar month and cumulative amounts stored at any one time. For further discussion of generator requirements, refer to the “Guide to Generator Requirements of the Colorado Hazardous Waste Regulations.”

A conditionally exempt small quantity generator may treat their own hazardous waste onsite without first obtaining a treatment permit or providing prior notification to the Department, or they must ensure delivery of their waste to a facility that is authorized to accept it. Since Colorado regulations prohibit onsite disposal of hazardous wastes without a permit and disposal of hazardous wastes in Subtitle D municipal or industrial solid waste landfills, most characteristic and all listed hazardous wastes must be disposed of in permitted Subtitle C hazardous waste facilities even after treatment. One exception is if the waste is a characteristic-only hazardous waste, it may be disposed of in a Subtitle D solid waste landfill after it has been successfully treated to remove the characteristic(s). Since conditionally exempt small quantity generators are not subject to the land disposal restrictions of CHWR Part 268, the conditionally exempt small quantity generator need only treat the waste to remove the characteristics and does not need to treat all of the underlying hazardous constituents. The waste will require further treatment (solidification) if it contains free liquids and is to be sent to a landfill for disposal because it is not permissible to dispose of liquids in a landfill.

Facilities operated solely for the treatment or storage of hazardous waste from conditionally exempt small quantity generators do not need a hazardous waste permit for these activities, though other regulations do apply. A few Colorado counties have developed innovative fee-based waste consolidation facilities and technical assistance programs to help conditionally exempt small quantity generators in their jurisdictions dispose of their hazardous wastes properly. Conditionally exempt small quantity generator wastes from multiple generators are consolidated and sent offsite for disposal, making it more cost-effective for all participants. Consolidation facility staff are generally available to provide basic technical assistance to businesses in their counties, but these facilities will only accept wastes for consolidation from the conditionally exempt small quantity generator business community within their jurisdiction. For more information, see our guidelines for developing conditionally exempt small quantity generator waste consolidation facilities at www.colorado.gov/cs/Satellite/CDPHE-HM/CBON/1251615961696.

3.6 Recycling [CHWR Section 261.6]

Recycling is a form of treatment. A material is recycled if it is used, reused, or reclaimed. These three terms have specific regulatory definitions. A material is used or reused if it is either employed as an ingredient in an industrial process to make a product or if it is employed as an effective substitute for a commercial product without being reclaimed first. A material is reclaimed if it is processed to recover a usable product or if it is regenerated.

When a material is recycled, its regulatory classification depends on two factors: what type of material is being recycled and what type of recycling is occurring. Some wastes that are recycled fall out of regulation as hazardous waste completely and some just fall out of the requirement to obtain a treatment permit. Examples include scrap metal, used oil, materials from which precious metals are recovered, and certain waste-derived fuels.

Generators of recyclable materials that are solid and hazardous wastes are subject to the same regulations as other generators of hazardous waste. The recycling exemption applies to the recycling unit itself, not the waste in it. Therefore, if the waste is stored prior to recycling, all applicable storage requirements and quantity limitations apply. If, on the other hand, the recyclable material is not stored before recycling and is put immediately into the recycling unit, it is not necessary to manage the recycling unit under the generator requirements. Typically, this is only allowed when the recycling unit is a tank or tank system. Whether it is hazardous waste after recycling depends on the unit and the waste. For example, regenerated solvents may no longer be hazardous wastes after recycling, but the sludges generated in the process may be.

Exemptions from the requirement to obtain a treatment permit for recycling hazardous waste are included in the specific requirements for recyclable materials outlined in CHWR Section 261.6 and Part 267, which are covered in more detail in Colorado's "Hazardous Waste Recycling Guidance Document."

3.7 Treatability Studies [CHWR Sections 100.10(a)(4) and 261.4(f)]

Treatability studies are meant to be one-time testing of methods and equipment and are not intended to be used for normal generator treatment activities. These studies may be done at cleanup and corrective action sites using a mobile treatment unit or samples may be sent to an offsite lab to determine if a treatment process would work.

“Treatability Study” means a study in which a hazardous waste is subjected to a treatment process to determine:

- (1) Whether the waste is amenable to the treatment process,*
- (2) what pretreatment (if any) is required,*
- (3) the optimal process conditions needed to achieve the desired treatment,*
- (4) the efficiency of a treatment process for a specific waste or wastes, or*
- (5) the characteristics and volumes of residuals from a particular treatment process.*

Also included in this definition for the purpose of the § 261.4(e) and (f) exemptions are liner compatibility, corrosion, and other material compatibility studies and toxicological and health effects studies. A “treatability study” is not a means to commercially treat or dispose of hazardous waste. [CHWR Section 260.10]

The hazardous waste regulations provide a conditional exemption for persons who generate or collect samples for the sole purpose of conducting treatability studies. As long as the conditions of the exemption are met, they are not subject to the requirements of Parts 261 through 263 (identification of hazardous waste, standards for generators, and standards for transporters) and the notification requirements of Part 99 [CHWR Section 261.4(e)]. In addition, the generator need not include treatability samples in the waste quantity calculations for determination of generator status as long as certain packaging, quantity limitation, and recordkeeping requirements are met and the samples are shipped to an authorized lab or testing facility.

CHWR Section 261.4(f) conditionally exempts both the treatability samples and the laboratories conducting the treatability studies from the requirements in Parts 261 through 268 and Part 99 (identification of hazardous waste, standards for generators, standards for transporters, standards for permitted and interim status facilities, financial assurance, land disposal restrictions and notification) and Part 100 permitting requirements as long as specific provisions are met. These provisions include specific notifications to the Department, obtaining an EPA identification number, quantity limitations, storage requirements, employee training requirements, recordkeeping requirements, and proper management and disposal of unused samples or treatment residues.

The laboratory conducting the treatability study must determine if any unused samples and/or treatment residues generated by the study are hazardous wastes. If the unused samples and residues are sent back to the generator, then the generator must make the hazardous waste determination on these materials. In either case, unused samples and/or residues determined to be hazardous waste must be disposed of at a permitted hazardous waste treatment, storage or disposal facility.

3.8 Universal Waste Rule [CHWR Section 100.10 (a)(14) and Part 273]

Colorado has adopted reduced management practices for most batteries, certain pesticides, certain mercury-containing devices, aerosol cans containing hazardous waste, mercury-containing lamps, and electronic devices and components under the Universal Waste Rule. Generators may choose to manage these wastes as universal wastes under CHWR Part 273 or continue to be subject to the full hazardous waste requirements of CHWR Parts 260-268, 99 and 100.

The Universal Waste Rule was designed to streamline the regulatory process to prevent illegal disposal in Subtitle D municipal and industrial solid waste landfills and to encourage recycling. The primary benefits of managing a universal waste in Colorado are that the waste can be shipped without a hazardous waste manifest, the waste can be shipped by common carrier instead of by a

hazardous waste transporter, the waste does not count toward the monthly total of hazardous waste in determining the generator category, the storage time limits are less restrictive, and specific treatment activities done by the universal waste handler do not require a hazardous waste treatment permit. Other states may have different requirements for wastes that are managed as universal wastes in Colorado. If shipping these wastes out of Colorado, the universal waste handler should always confirm the regulatory status of the waste in the destination state and in all intervening states the waste will travel through.

A universal waste handler may conduct certain treatment activities as defined in Part 273 without obtaining a hazardous waste treatment permit. These activities must be done in a manner to prevent releases of regulated wastes, and any releases that do occur must be contained and cleaned up immediately. The facility must have written procedures for conducting these activities and employees need to be thoroughly familiar with the proper procedures and waste handling techniques relevant to their level of responsibility. A universal waste handler may:

- Discharge batteries to remove the electric charge, regenerate used batteries, disassemble batteries or battery packs into individual batteries or cells, remove batteries from consumer products, or remove electrolyte from batteries as long as the casing of each battery or cell is immediately closed after removal. Intact batteries and batteries from which the electrolyte has been removed may continue to be managed as universal waste. At the point the electrolyte is removed from the battery or cell, the electrolyte is no longer considered to be a universal waste and must be managed in accordance with all hazardous waste regulations if the electrolyte exhibits one or more characteristics of hazardous waste. This newly generated waste must be included in the generator status determination and all applicable generator requirements must be met. [CHWR Section 273.13(a), 273.33(a)]
- Remove mercury-containing ampules from devices and drain elemental mercury from certain mercury-containing devices. Intact mercury-containing ampules may continue to be managed as universal waste. Elemental mercury drained from an open-ended mercury-containing device must be stored in a closed, non-leaking container. The universal waste handler may accumulate up to 35 kilograms (about 77 pounds) of elemental mercury on site at any one time and must maintain documentation of the date(s) of accumulation, a description of the device(s) drained and the amount of mercury drained from each device. [CHWR Section 273.13(c), 273.33(c)]
- Puncture universal waste aerosol cans to remove and collect the contents of the cans. At the point the material is removed from a punctured aerosol can, the removed material is no longer considered to be a universal waste and must be managed in accordance with all hazardous waste regulations. This newly generated waste must be included in the generator status determination and all applicable generator requirements must be met. Once the cans have been emptied, they can be managed as RCRA empty containers. As long as the aerosol can did not contain an acutely hazardous waste, the can may either be recycled as scrap metal or disposed of as solid waste. [CHWR Section 273.13(d), 273.33(d)]
- Crush universal waste lamps in properly designed and operated crushing units. The crushed lamps may continue to be managed as universal wastes and be sent for recycling or disposal as hazardous waste. [CHWR Section 273.13(e), 273.33(e)]

- Disassemble waste electronic devices and components. Intact electronic devices do not meet the definition of scrap metal. Disassembled type-separated components (e.g., circuit boards, wiring, and metal parts) can often be managed as scrap metal once removed from waste electronic devices. Partially disassembled components, such as intact hard drives, can continue to be managed as universal waste. Until further disassembly, these are not considered to be scrap metal. Materials such as crushed glass (cullet) from monitors can be managed as commodities if the material is sent directly to a facility that uses it as feedstock to make new products. Other disassembled components, such as plastic casings from monitors and keyboards, can be recycled or disposed of as non-hazardous solid waste. The universal waste handler must make a hazardous waste determination on the separated components and manage each accordingly.

Shredding, crushing and other size-reduction techniques may also be used under this rule. The resulting size-reduced materials can continue to be managed as universal waste or are subject to the full hazardous waste regulations. Until these materials are separated by material type, they are not eligible for any exclusions available in the hazardous waste regulations. [CHWR Section 273.13(f), 273.33(f)]

Some wastes may continue to be managed as universal wastes after treatment, while other wastes are no longer allowed to be managed as universal waste. Except for disassembled or size-reduced type-separated waste electronic devices, most other universal wastes are still hazardous wastes after the treatment activity has been completed.

4.0 OTHER WAYS TO TREAT WITHOUT A PERMIT

There are two additional ways generators may treat their own waste without going through the hazardous waste permitting process. Generators may treat their own waste under the permit by rule provisions of CHWR Section 100.21(d) or they may treat their own waste to meet one or more of the land disposal restrictions without obtaining a treatment permit. The permit by rule provisions are most often be used for physical treatment of hazardous waste. The provisions for treatment to meet land disposal restrictions cover most instances where chemical treatment is used. Treatment under either of these provisions requires, among other things, a written waste analysis plan describing the chemical and physical characteristics of the waste, details of the treatment process, and additional recordkeeping and documentation.

Thermal treatment and treatment of reactive waste are excluded from these generator treatment provisions because of the inherent dangers of fire, explosion, or evolution of toxic gases involved. Instead, such treatment is subject to the full hazardous waste permitting requirements.

4.1 Permit by Rule [CHWR Sections 100.10 (a)(13) and 100.21(d)]

Permit by rule allows generators to treat their hazardous wastes in tanks or containers without a hazardous waste treatment permit in order to reduce its volume or toxicity, or to increase the ability to recycle or reclaim the waste prior to shipping it offsite. This decreases environmental and health risks as well as costs to ship and process the waste.

A generator can treat their own waste under the permit by rule provisions if they comply with the generator requirements of CHWR Part 262 as well as the requirements for ignitable, reactive, or incompatible wastes in CHWR Section 265.17. The generator must develop a written waste analysis plan (WAP) that provides a detailed chemical and physical analysis of their waste and

detailed procedures that will be used to treat it. A copy of the waste analysis plan must be kept in their facility files for at least three years from the date that the waste was last treated onsite, but is no longer required to be submitted to the Department.

There is often a question of when a permit by rule is needed, and when the “treatment” is simply a normal part of the process. One distinction is whether the treatment is an integral part of the process that generates the waste or something that’s being done for another reason. This is often hard to distinguish by definition, so examples will be used to illustrate the difference.

Physical treatment (crushing or compacting) is often covered by permit by rule because the act of crushing or compacting an item reduces its volume, thus meeting the definition of treatment. Physical treatment is not something done to meet the land disposal restrictions, however. The circumstances of why or how the item was crushed or compacted can affect the need for a permit by rule. For example, some processes require the use of small autosampler vials containing solvents. Normal laboratory procedure is to use a vial crusher to separate the remaining solvent from the inert glass and cap. Crushing the vial in this context would not require a permit by rule if 1) the vial crushing unit is an integral part of the laboratory process; 2) the vial crushing unit is used at or near the point of generation of the vials; 3) a hazardous waste determination is made for all wastes generated from the process; and 4) a written procedure on how to safely use the unit is developed and implemented. The use of a fluorescent lamp crusher, on the other hand, would require a permit by rule unless the lamps are managed as universal wastes under CHWR Part 273. The lamp crusher is not an integral part of the process that generates waste fluorescent lamps.

4.2 Land Disposal Restrictions (LDR) [CHWR Part 268]

The land disposal restrictions (LDR) require that a hazardous waste meet or be treated to meet specified standards for hazardous constituents before being disposed of on the land. Instead of requiring barriers to separate hazardous contaminants from groundwater like other hazardous waste requirements, the land disposal restrictions require that hazardous waste undergo fundamental physical or chemical changes so that the waste poses less of a threat to groundwater. The obvious advantage of hazardous waste treatment is that it provides a more permanent and lasting form of groundwater protection than does simple hazardous waste containment. In addition to prohibiting the disposal of wastes that do not meet treatment standards, the LDRs also forbid the storage of hazardous waste as substitute for meeting the required treatment standards and forbid the dilution of wastes as a substitute for legitimate treatment.

Generators may treat their hazardous wastes to meet one or more applicable LDR treatment standards without obtaining a hazardous waste permit. The permit exemption for generator treatment only extends to treatment activities that share the same standards as storage (i.e., the treatment must occur in tanks or containers). The standards for thermal treatment are different than generator storage requirements because of the inherent dangers of fire, explosion, or evolution of toxic gases; therefore, thermal treatment may not be performed without a hazardous waste permit.

If treating their hazardous waste to meet LDR treatment standards, the generator must modify their contingency plan, training plan, security plan, etc. to reflect the change in processes required for treatment to meet the land disposal restrictions. There are also increased requirements for recordkeeping and a detailed waste analysis plan must be prepared before treatment can begin. Treatment must occur in an accumulation tank or container or in a containment building. If any of these elements are missing, then the generator is conducting illegal treatment of hazardous waste.

Generators treating their wastes that are subject to LDR have certain notification and certification requirements under CHWR Section 268.7. Whether or not they treat their waste onsite, the generator is always responsible for notifying subsequent facilities that treat, store, or dispose of the waste of the waste's LDR status. Much like a hazardous waste manifest, the LDR notification and certification paperwork helps hazardous waste handlers and regulatory agencies ensure that wastes are properly managed.

Generators may partially treat a waste to meet an LDR standard without treating the waste for all applicable LDR standards. Partially treated wastes must be sent to a permitted facility for additional treatment to meet the rest of the standards before disposal can occur. If a waste is subject to the land disposal restrictions at the point of generation, then all of the LDR requirements continue to apply to the waste even if it is later de-characterized. Even after treatment to meet the appropriate treatment standards, most hazardous wastes must still be disposed of in a Subtitle C hazardous waste facility.

4.3 Waste Analysis Plan

Generator treatment greatly increases the importance of proper waste analysis in order to ensure that treatment is conducted in a safe manner and that standards are consistently met prior to disposal. A waste analysis plan is used to document the procedures used to obtain representative samples and ensure detailed chemical and physical analyses of the samples are conducted. It is also used to document any special handling procedures for the waste and must contain all information necessary for proper treatment of the waste. Development of the waste analysis plan allows the generator to analyze different treatment options, provides for reliable waste identification, promotes consistency in waste analysis, treatment, and disposal independent of changes in personnel, describes how employee exposures will be minimized, ensures adequate personnel training and re-training as conditions change, provides for appropriate spill prevention and response, describes the physical and chemical reactions that will occur in order to ensure waste compatibility with treatment, and demonstrates compliance with hazardous waste requirements.

A waste analysis plan has six key elements:

- **Facility Description** – The facility description section must provide sufficient information in order to understand what hazardous wastes are generated, the processes and activities that generated the waste, the processes and activities used to manage the waste, and descriptions of the hazardous waste management units. This information may be in the form of diagrams, schematics, or narrative descriptions. For example, when describing waste management units, the generator should provide a physical description of the unit, the location of the unit within the facility, a description of wastes managed in the unit, methods of waste handling or management, considerations for making sure the unit is operating safely and correctly, and information on what wastes or handling techniques should not be used with the unit.
- **Selecting Waste Analysis Parameters** - Waste analysis parameters should be selected to represent those characteristics necessary for safe and effective waste management. Specific parameters need to be selected to ensure that the wastes generated are accurately identified and to ensure that all applicable requirements are met. This is especially important when managing incompatible wastes to prevent undesirable reactions. Proper waste analysis is

crucial in making sure the process and equipment can handle the waste to be treated. Considerations include the type and volume of waste, treatment method, location of the unit, and how the unit is constructed. The waste analysis plan provides the rationale for selection of each parameter.

- **Selecting Sampling Procedures** - Waste streams must be sampled and handled to preserve the original physical form and composition of the waste. Contamination or changes in concentration of the parameters to be analyzed for need to be prevented. In order to maximize data accuracy, minimize errors, and coordinate sampling activities, the sampling procedures section should include a description of the sampling and analysis objectives, a description of the type of samples to be collected, how sample locations will be selected, the number of samples to be obtained, how frequently the samples should be taken, and proper collection and handling techniques. These parameters should be selected based on the physical and chemical properties of the waste. The generator needs to ensure that sufficient quality assurance/quality control (QA/QC) measures are in place in order to demonstrate that the data is technically sound, statistically valid, and properly documented. A representative sample may be obtained using one of the methods described in Appendix I of CHWR Part 261 or an equivalent sampling method. Examples of acceptable methods include ASTM standards, SW-846, and manufacturer specifications.
- **Selecting a Laboratory and Analytical Methods** - The laboratory used to analyze the waste samples should have a comprehensive quality assurance/quality control program and an effective data management system to ensure the proper collection and quality of the data. The laboratory should also be able to demonstrate their analytical expertise in the techniques and methods required for accurate sample analysis. The analytical methods chosen must be adequate to effectively prepare the samples for analysis and to make a sufficient analytical determination for the waste.
- **Selecting Waste Re-evaluation Frequencies** - The generator must plan to repeat the waste analysis procedure as frequently as necessary to ensure that it is accurate and up to date. At a minimum, this should occur when the process that generates the waste changes or if the generator is notified by a subsequent waste management facility that their characterization of the waste doesn't match the pre-approved specifications or accompanying paperwork. A good approach is for the generator to plan to re-evaluate the waste on a regular basis.
- **Special Procedural Requirements** - The waste analysis plan should be designed to ensure that the waste handler has sufficient knowledge of the waste to manage it safely. Procedural requirements necessary to handle specific waste streams must be provided, including clear instructions for identifying and managing ignitable, reactive, and incompatible wastes.

The written waste analysis plan must be maintained in the facility files and be available for inspection by regulators. Records of all test results, waste analyses, and hazardous waste determinations must be kept for at least three years from the date the waste was last sent for final treatment, storage, or disposal.

For more information on developing a waste analysis plan, refer to US EPA's "Waste Analysis at Facilities that Generate, Treat, Store, and Dispose of Hazardous Wastes: A Guidance Manual" (www.epa.gov/osw/hazard/tsd/ldr/wap330.pdf).

5.0 CONTACT INFORMATION

24-hour Emergency Spill/Release Reporting Line (toll-free)..... (877) 518-5608
Hazardous Materials and Waste Management Division (303) 692-3300
 Division (toll-free outside 303 area code).....(888) 569-1831
 Customer Technical Assistance Line(303) 692-3320
 Customer Technical Assistance Line toll-free (888) 569-1831 ext. 3320
 For an EPA I.D. Number (303) 692-3360
Pollution Prevention Program(303) 692-2977

National Response Center.....(800) 424-8802

Send Questions in Writing to:

Colorado Department of Public Health and Environment
Hazardous Materials and Waste Management Division
4300 Cherry Creek Drive South
Denver, Colorado 80246-1530
OR
FAX (303) 759-5355
OR
Email address: **comments.hmwmd@state.co.us**

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

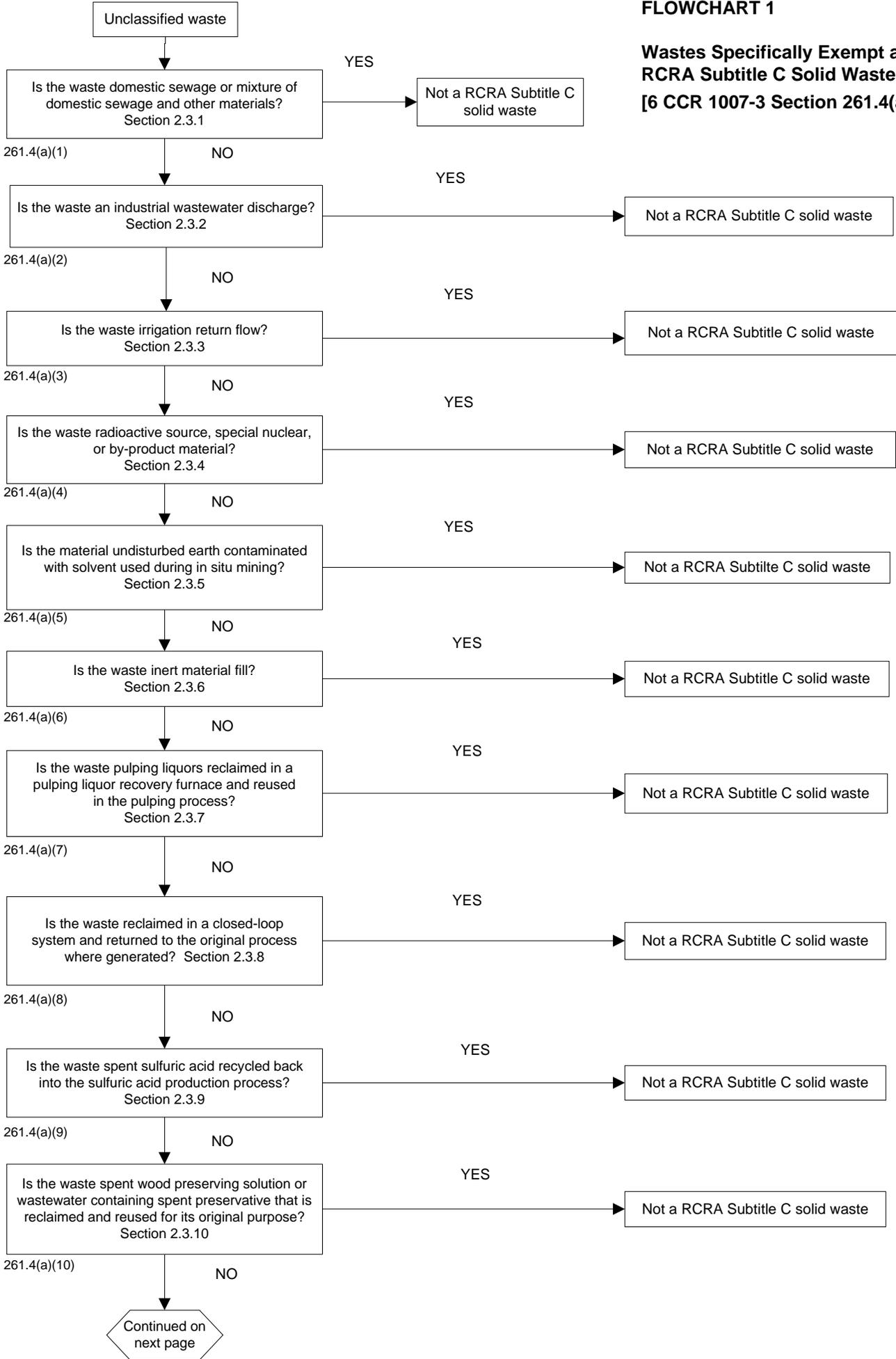
Web Sites:

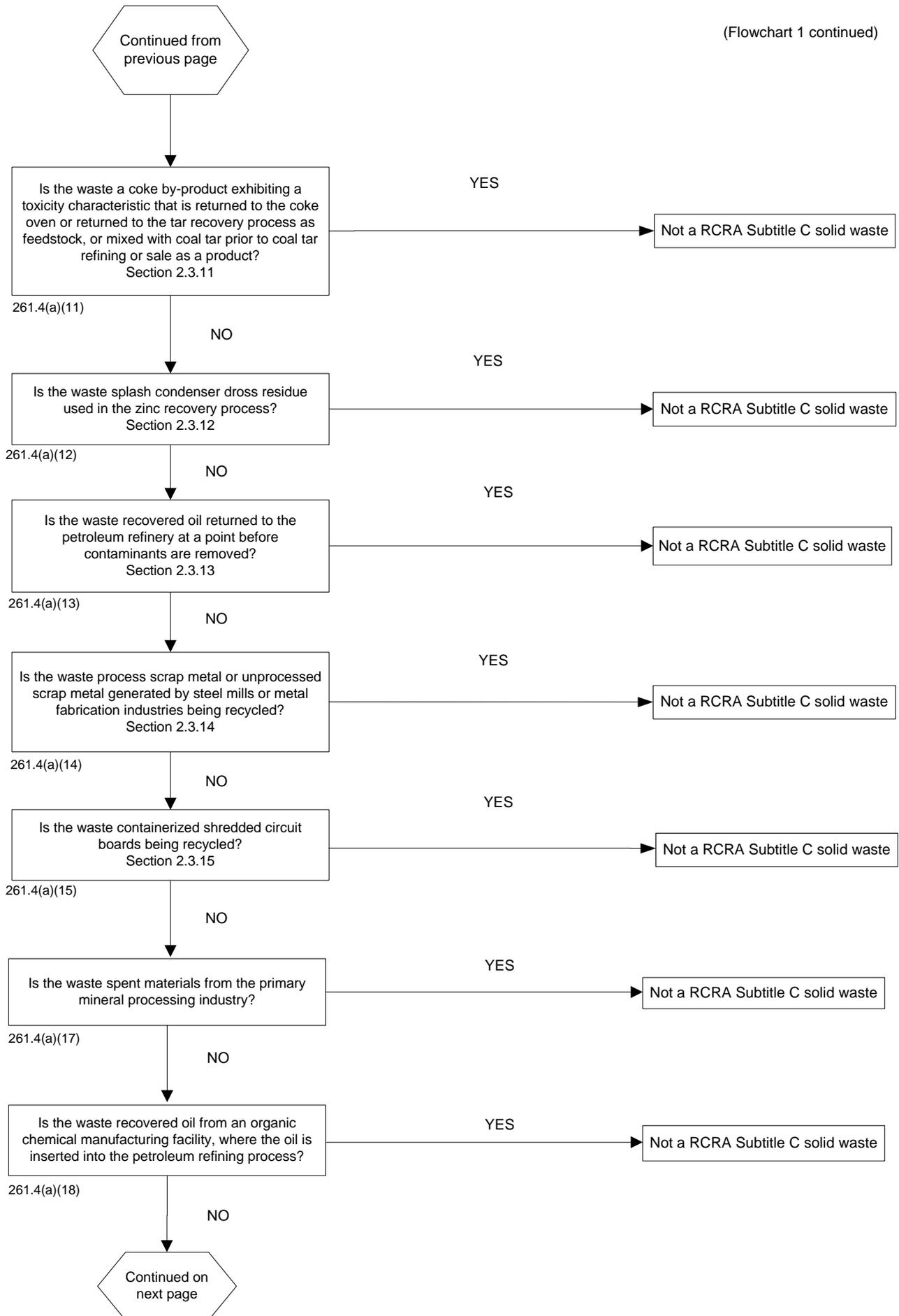
Hazardous Materials & Waste Management Division
www.colorado.gov/cdphe/hm

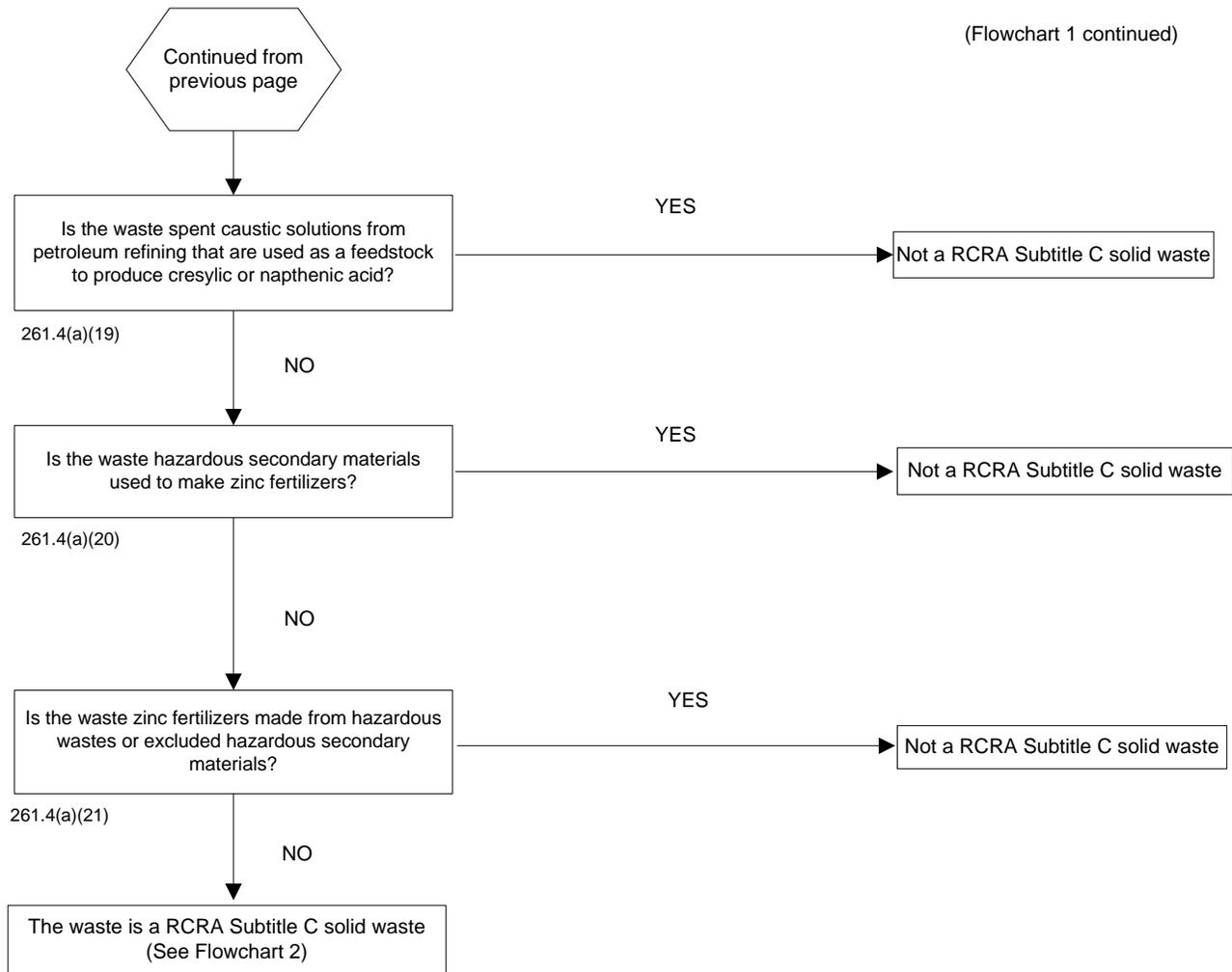
Colorado Department of Public Health and Environment
www.colorado.gov/cdphe

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

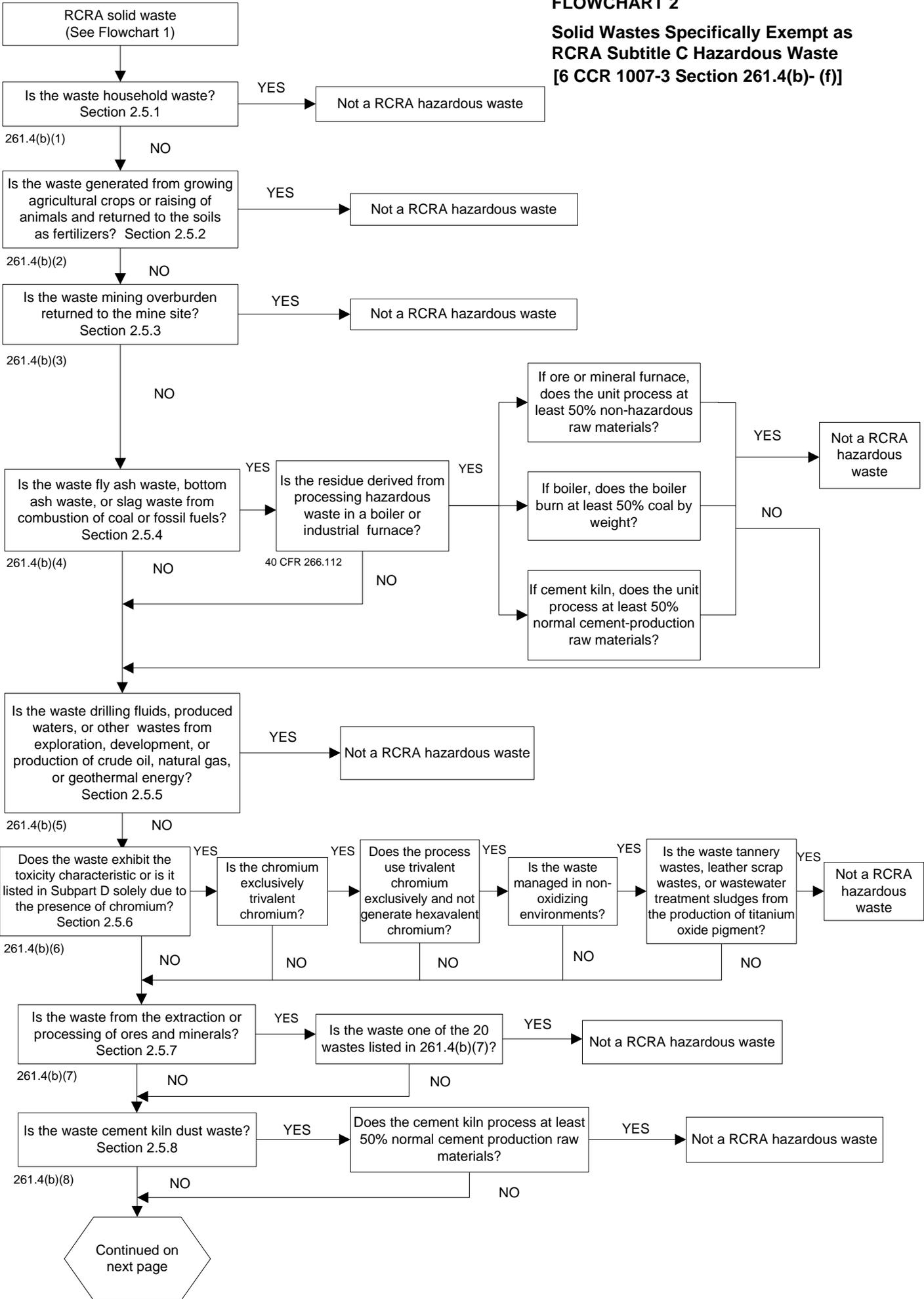
261.4(a)(2)

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

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

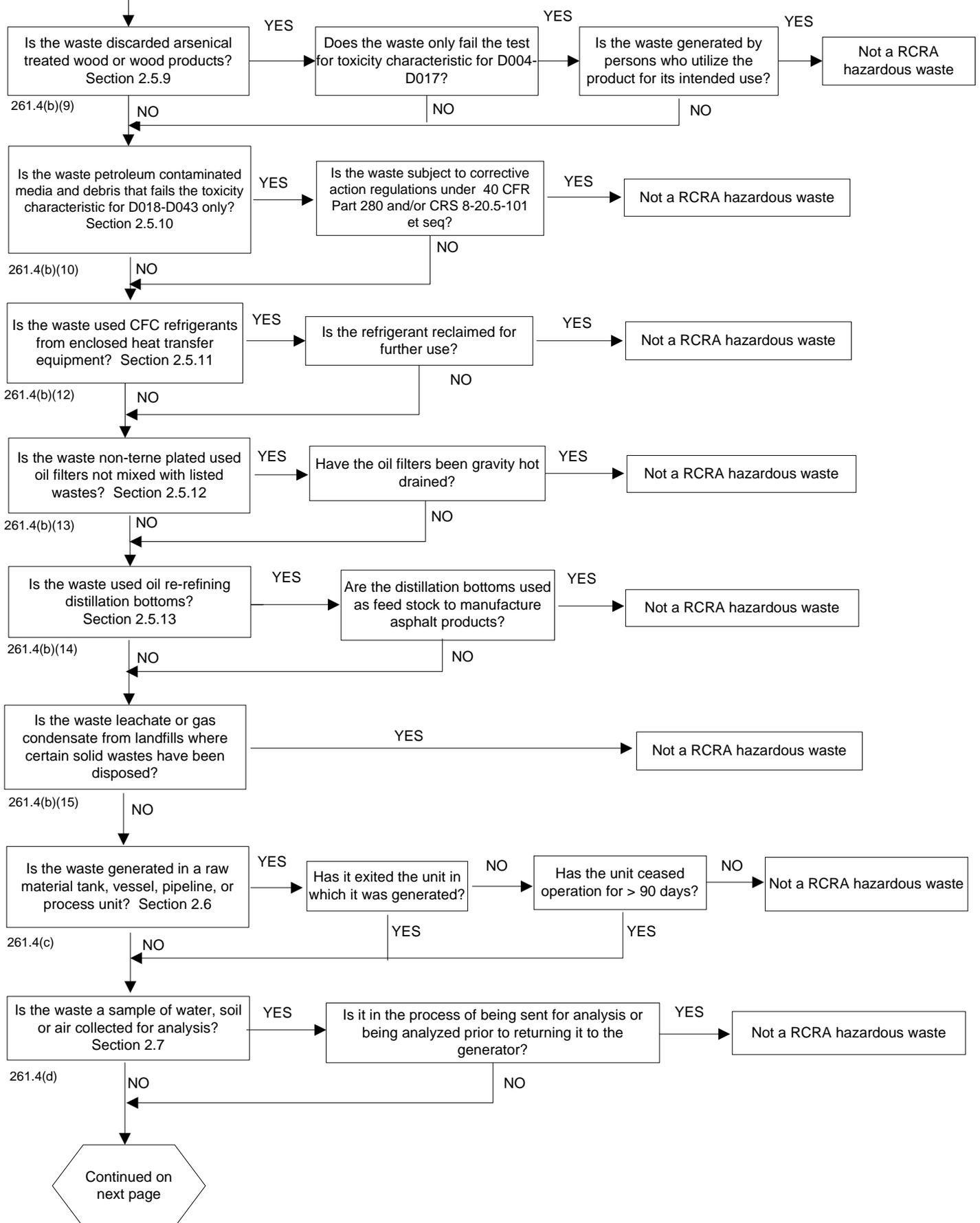
Note: Wastes that are not regulated as RCRA Subtitle C solid or hazardous wastes may be regulated under other statutes and/or regulations such as the Colorado Solid Waste Regulations, Colorado Water Quality Control Regulations, Colorado Radiation Control Regulations, Atomic Energy Act, and Clean Water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

FLOWCHART 2
Solid Wastes Specifically Exempt as
RCRA Subtitle C Hazardous Waste
[6 CCR 1007-3 Section 261.4(b)- (f)]



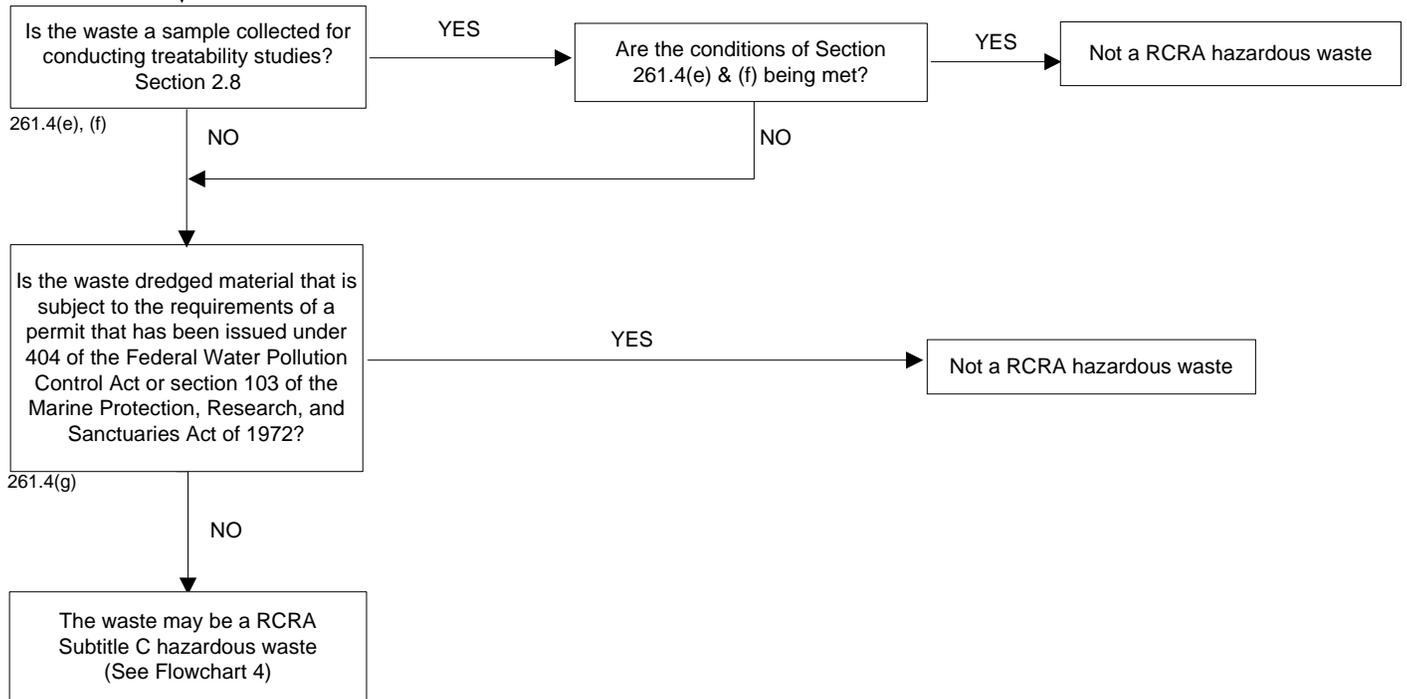
Continued from previous page

(Flowchart 2 continued)



Continued from previous page

(Flowchart 2 continued)



Key

Is the waste cement kiln dust waste?
Section 2.5.8

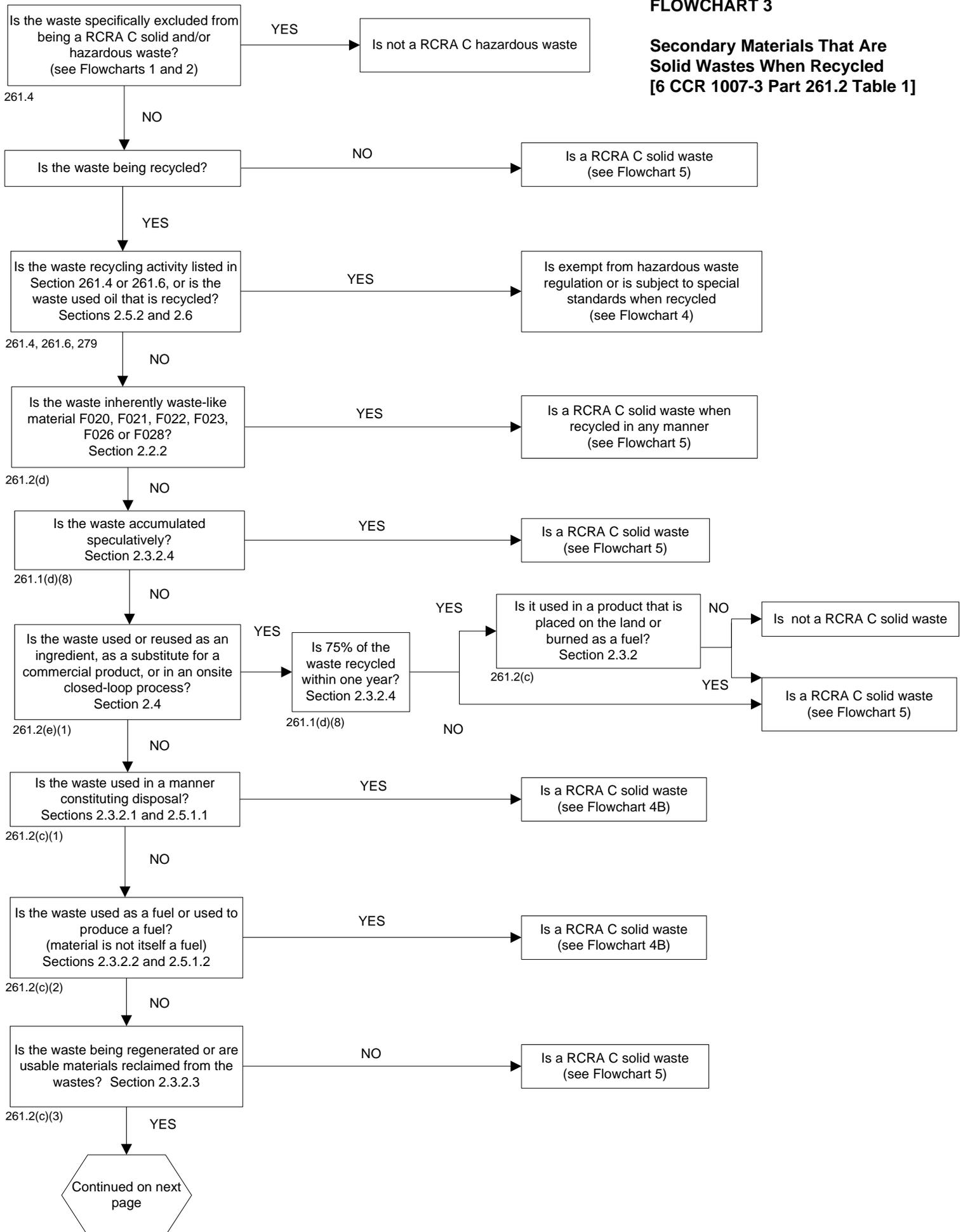
Refers to the "CDPHE Solid Waste Definition and Solid and Hazardous Waste Exclusions Guidance Document"

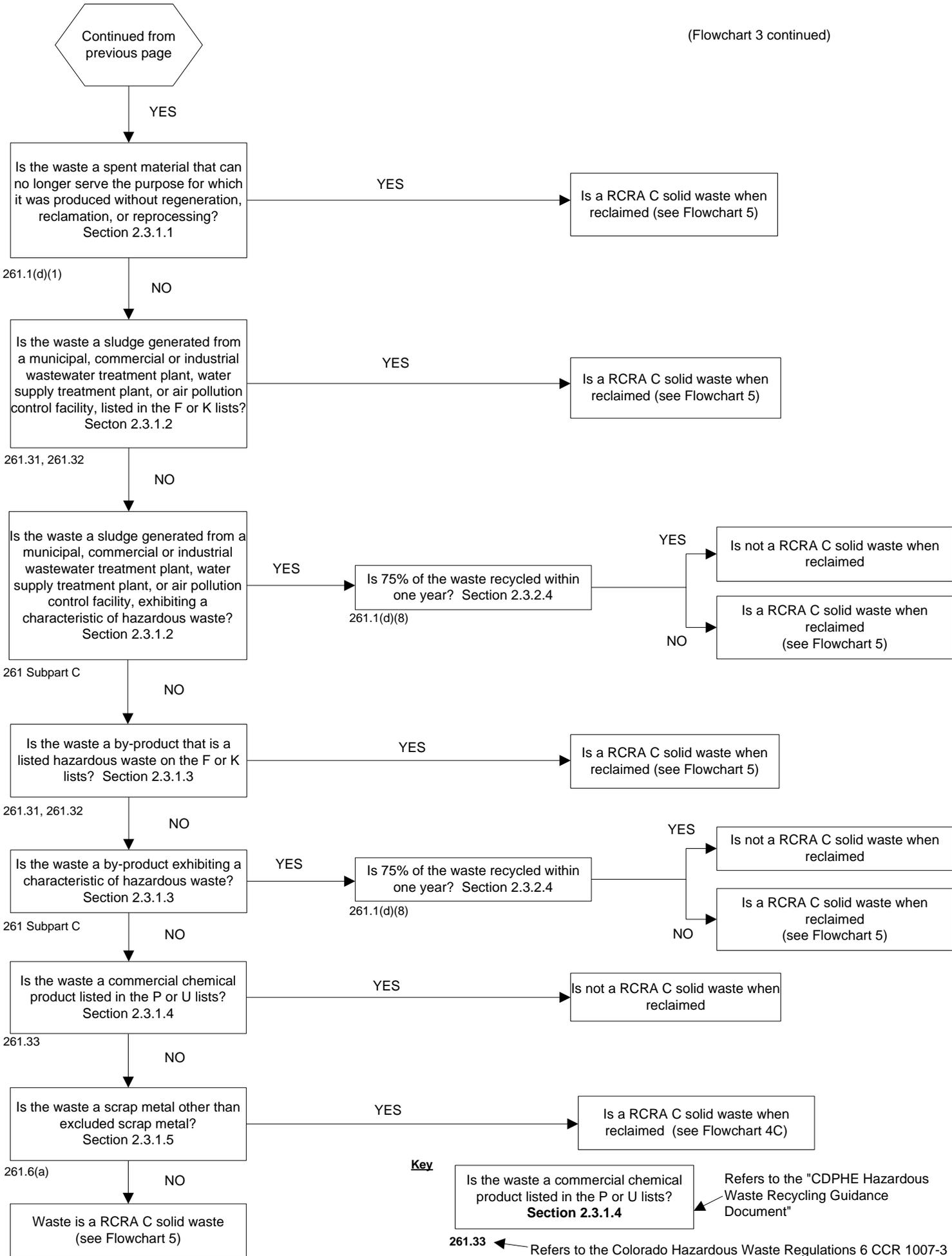
261.4(b)(8)

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

FLOWCHART 3

Secondary Materials That Are Solid Wastes When Recycled [6 CCR 1007-3 Part 261.2 Table 1]

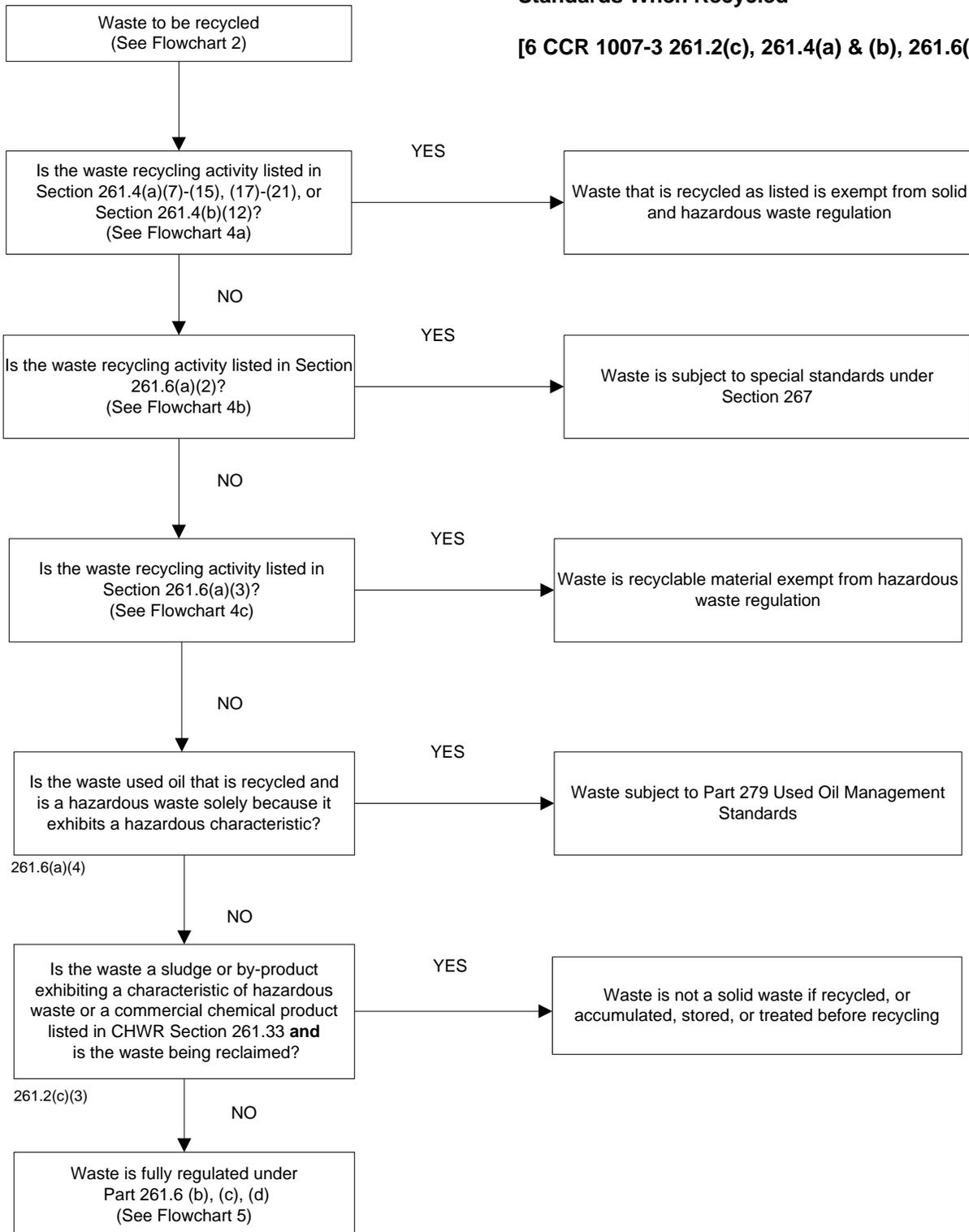




FLOWCHART 4

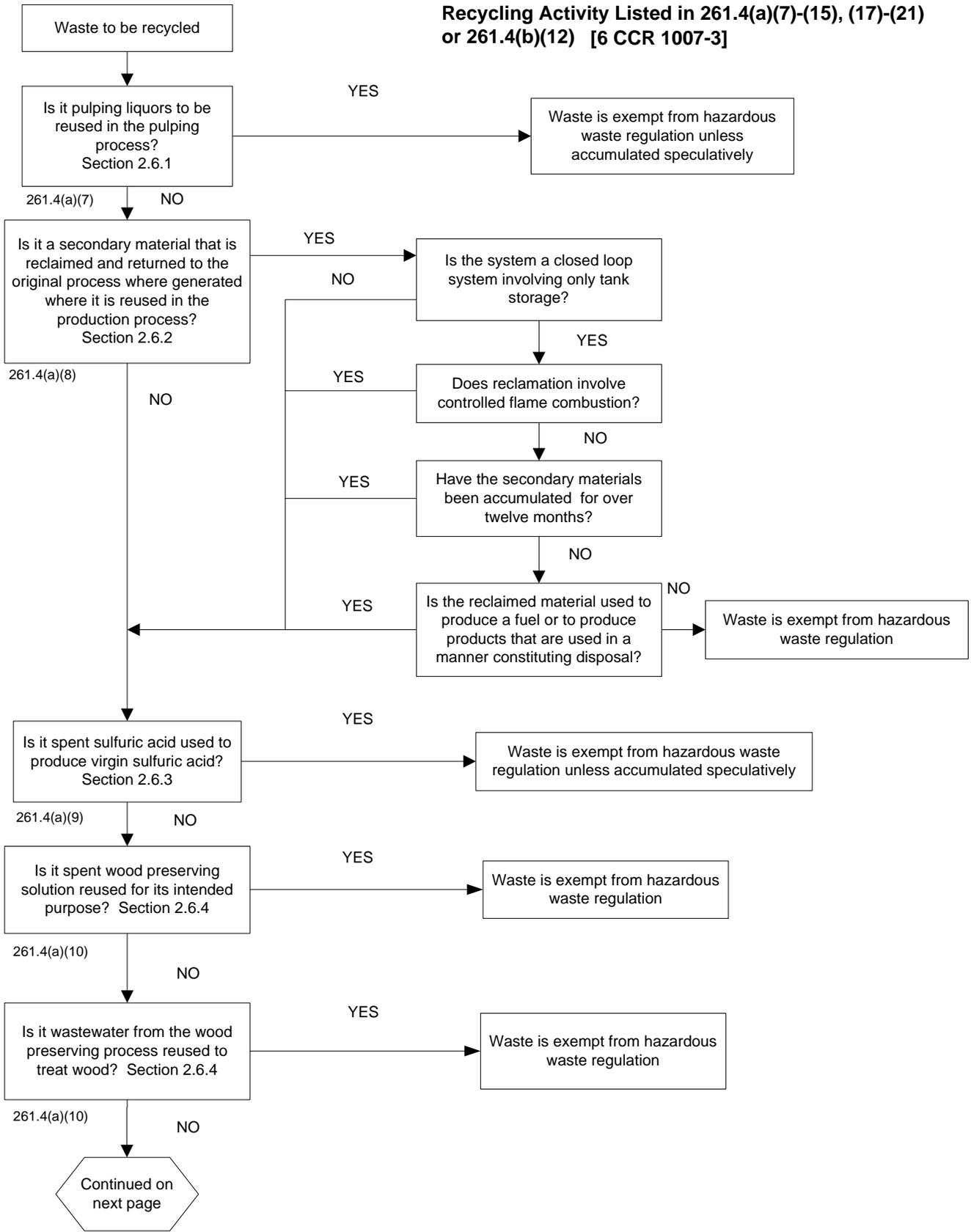
Solid Wastes Specifically Exempt as Hazardous Wastes or Subject to Special Standards When Recycled

[6 CCR 1007-3 261.2(c), 261.4(a) & (b), 261.6(a)]



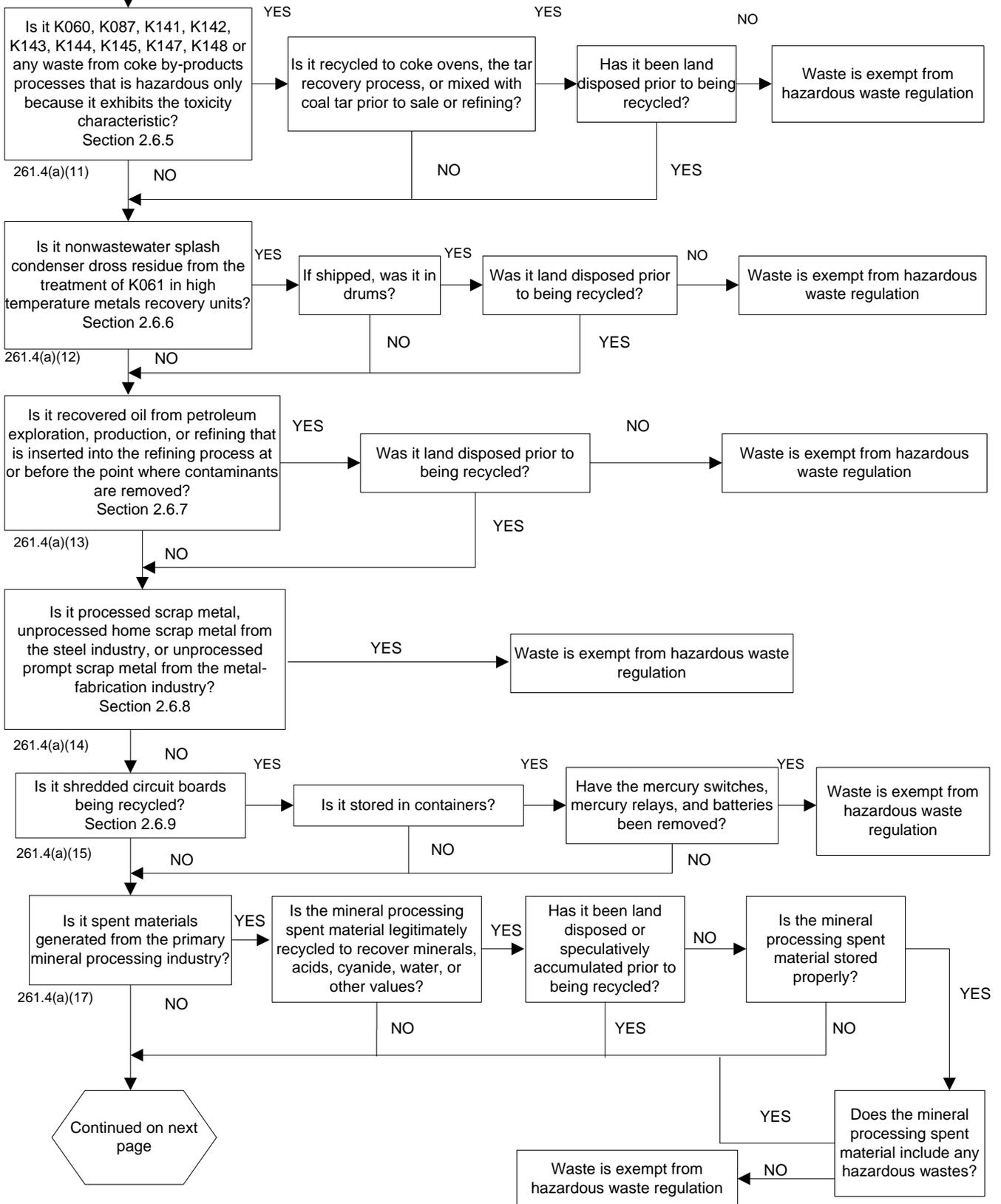
FLOWCHART 4A

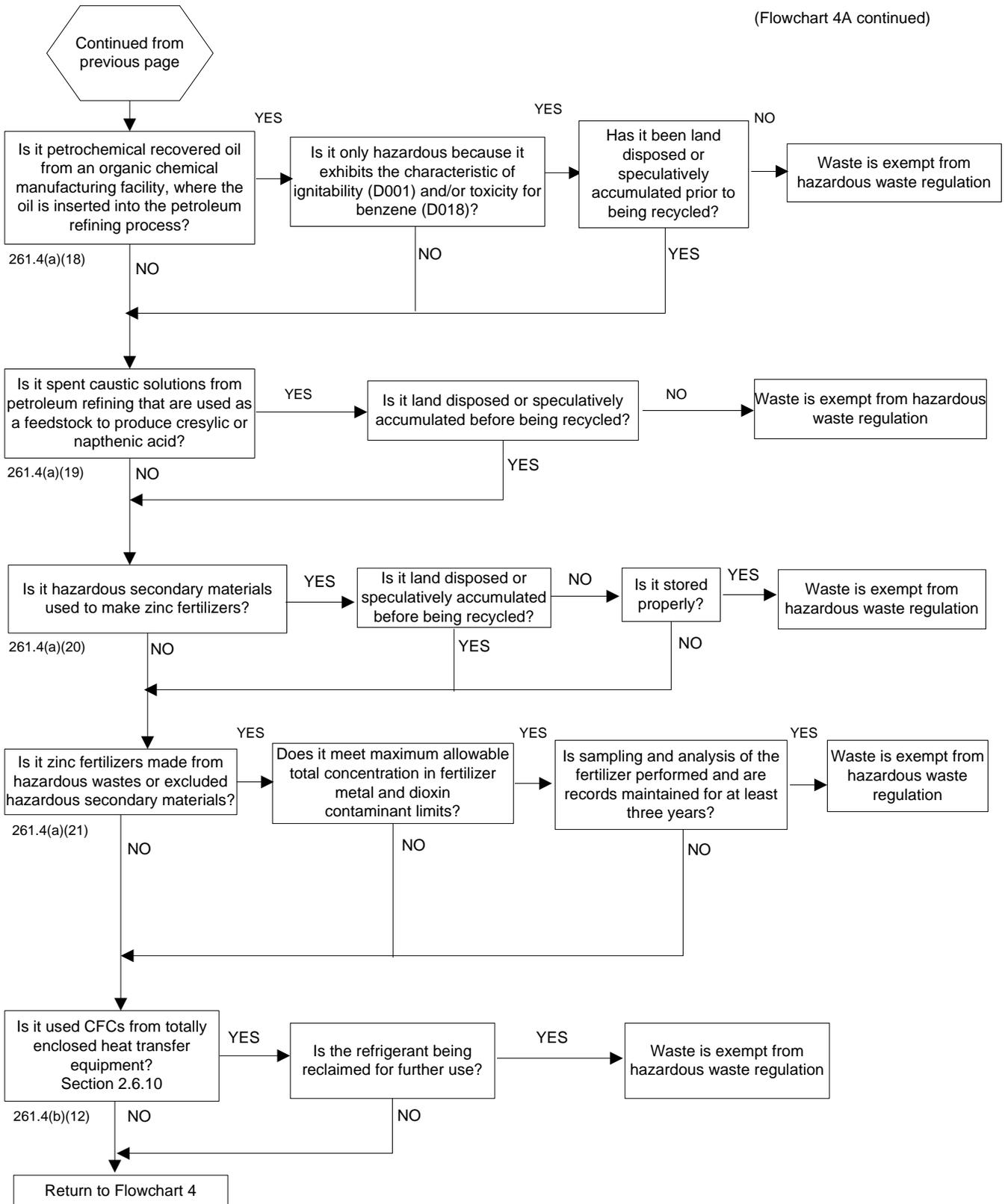
Recycling Activity Listed in 261.4(a)(7)-(15), (17)-(21) or 261.4(b)(12) [6 CCR 1007-3]



Continued from previous page

(Flowchart 4A continued)





Key

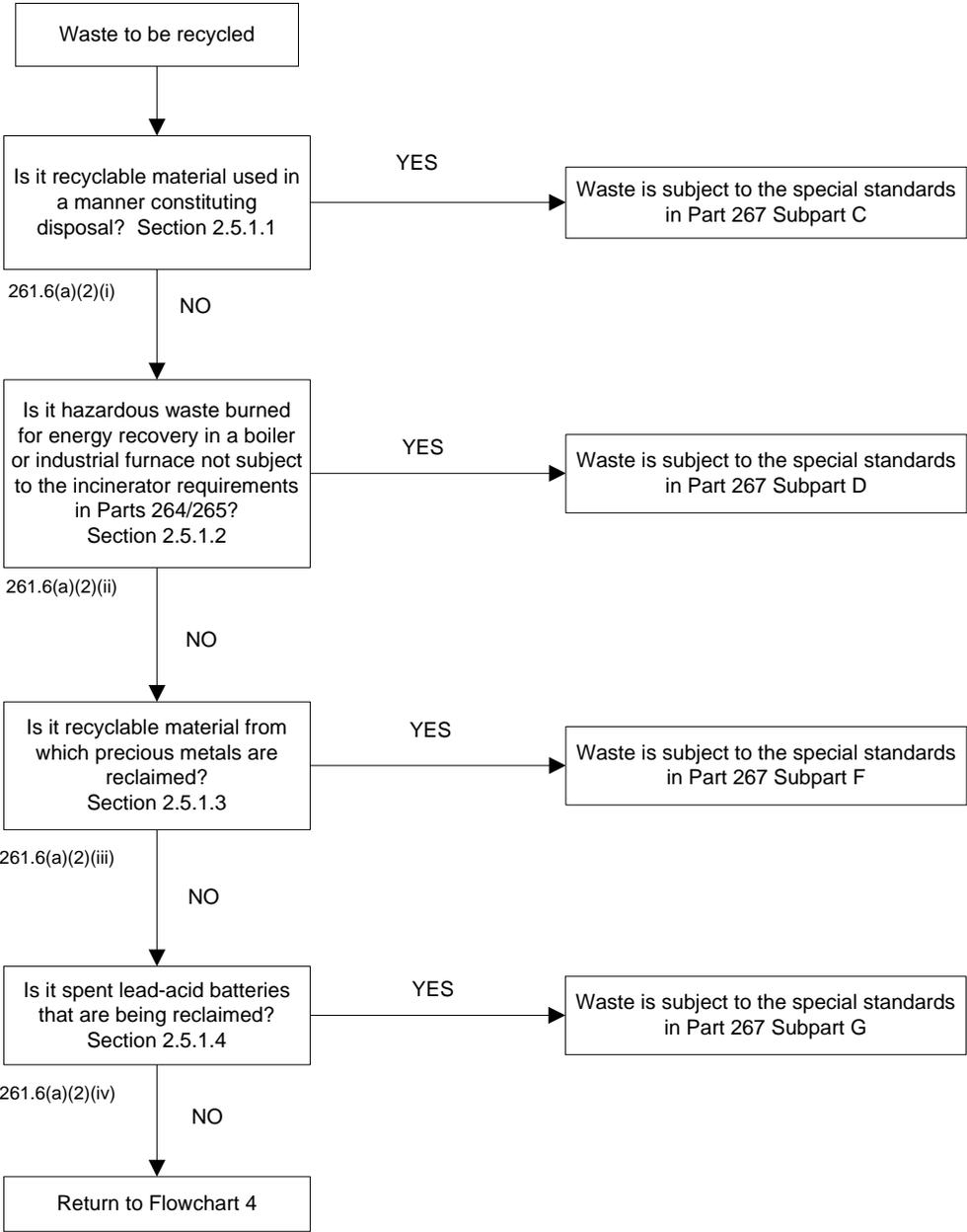
Is it spent sulfuric acid used to produce virgin sulfuric acid?
Section 2.6.3

Refers to the "CDPHE Hazardous Waste Recycling Guidance Document"

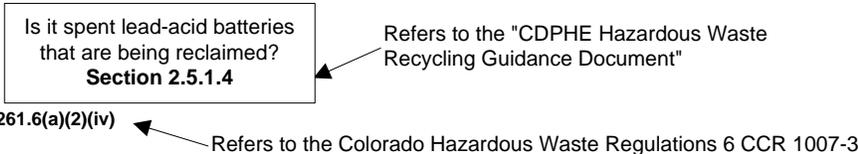
261.4(a)(9) ← Refers to the Colorado Hazardous Waste Regulations 6 CCR 1007-3

FLOWCHART 4B

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

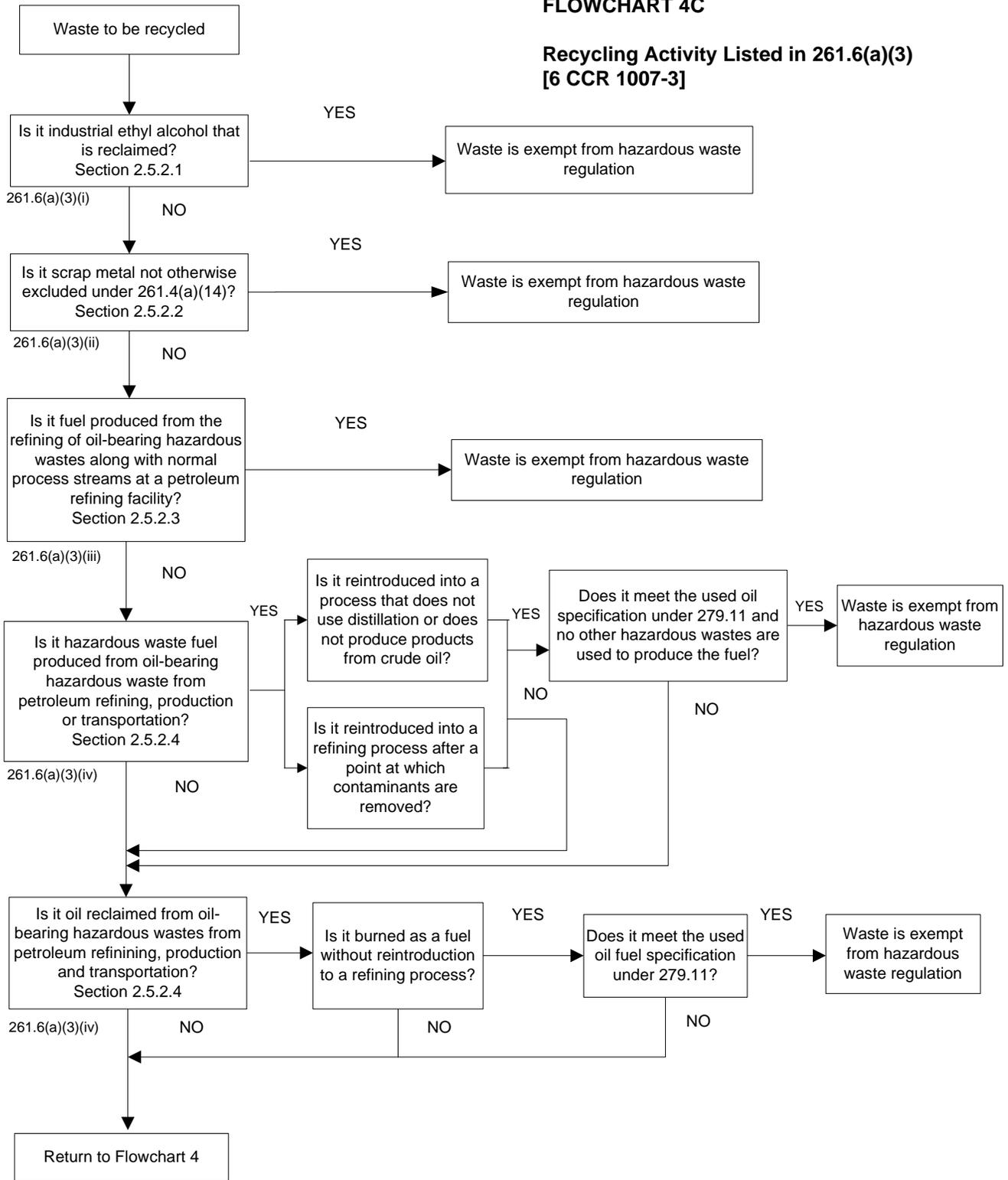


Key



FLOWCHART 4C

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



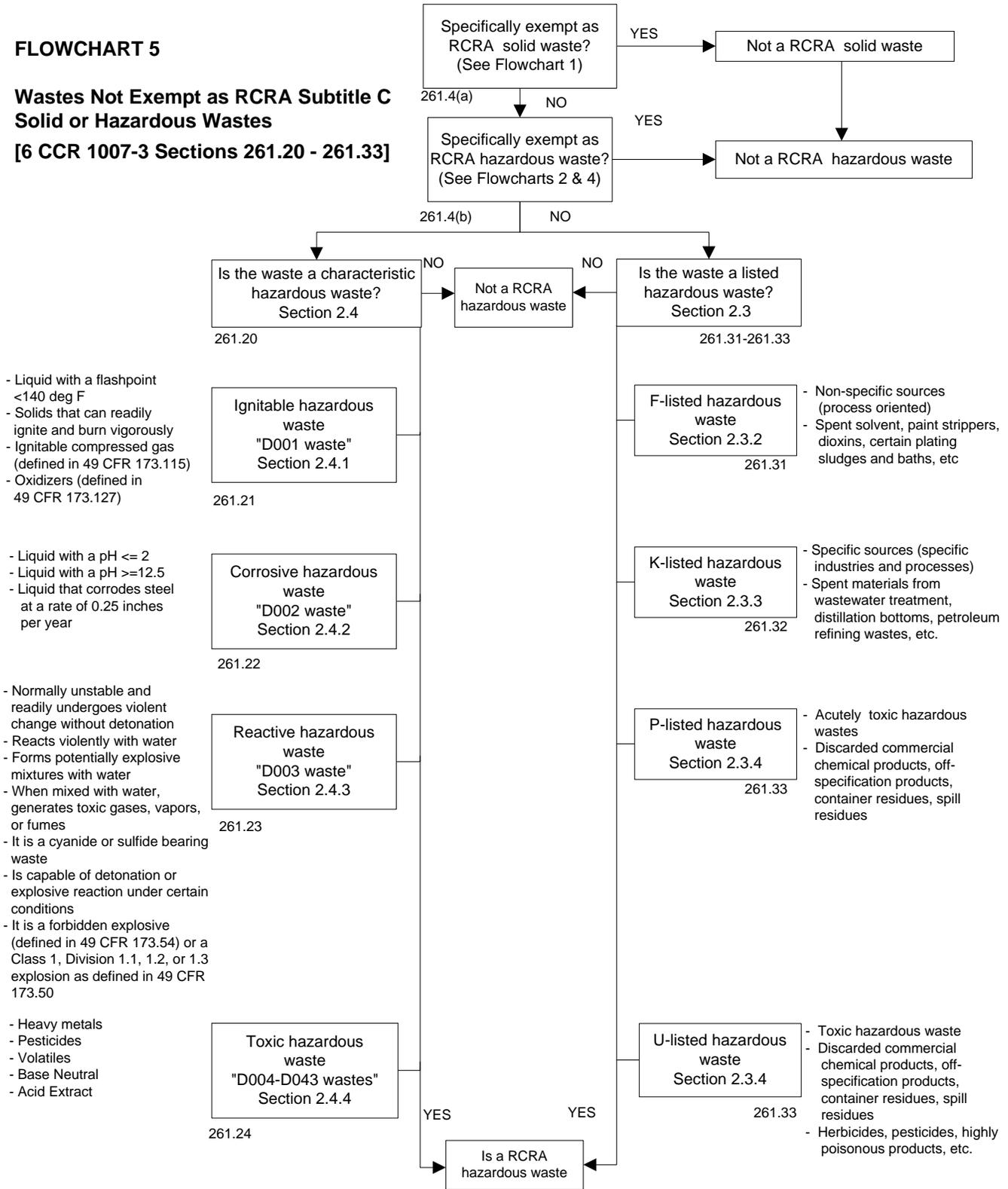
Key

Is it industrial ethyl alcohol that is reclaimed?
Section 2.5.2.1 ← Refers to the "CDPHE Hazardous Waste Recycling Guidance Document"

261.6(a)(3)(i) ← Refers to the Colorado Hazardous Waste Regulations 6 CCR 1007-3

FLOWCHART 5

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



Key

