

# A System's Guide to the Identification and Disposal of Hazardous and Non- Hazardous Water Treatment Plant Residuals



**D**rinking water systems producing solid waste are required under the Resource Conservation and Recovery Act (RCRA) to determine whether that waste is hazardous. These requirements are described in this document in summary form only; you need to consult the statutory and regulatory provisions that are applicable to the waste you generate or manage in order to determine the requirements with which you must comply. This document also provides additional recommendations and information on possible options; these are not regulatory requirements and are provided for your information only. EPA will continue to review and update this Guide as necessary and appropriate.

RCRA's definition of solid waste (40 CFR 261.2) is broad,<sup>1</sup> encompassing all wastes that a water treatment plant (WTP) would produce, including liquid residuals, solid residuals, and sludge. Although most water systems can avoid generating hazardous wastes, some WTP residuals may contain certain contaminants, such as arsenic, in high enough concentrations to be classified as hazardous. For additional information on RCRA, see [www.epa.gov/epaoswer/osw/laws-reg.htm](http://www.epa.gov/epaoswer/osw/laws-reg.htm).

<sup>1</sup> Solid waste includes any garbage; refuse; sludge from a wastewater treatment plant, water supply treatment plant, or air pollution control facility; and other discarded material, including solid, liquid, semisolid, or contained gaseous material, resulting from industrial, commercial, mining, and agricultural operations and from community activities.

## WTP Residuals

The following sections summarize the steps you must take to determine whether your residuals are hazardous, your generator status if you are generating or storing hazardous waste, and your disposal options for hazardous and non-hazardous residuals.

Hazardous waste regulations vary from state to state. It is important to check with your primacy agency to determine whether you need to meet additional requirements.

### STEP 1: WASTE IDENTIFICATION

WTP waste identification is a two-step process:

1. Determine whether the waste is hazardous using your knowledge of the waste generation process, analytical testing, or a combination of both. See Decision Tree 1 on page 4 for additional information on hazardous waste identification.
  - **Process knowledge** is detailed information on the processes that create wastes (i.e., does the process concentrate or dilute the waste?). It can be obtained by reviewing treatment schematics and plans, published waste analysis data or studies on similar treatment processes, or data from other treatment facilities, among other things. Note that if you use process knowledge alone to characterize the waste, you will be held responsible for any inaccurate determinations.
  - **Analytical testing** may involve leachate tests such as the Toxicity Characteristic Leaching Procedure (TCLP) (EPA Method 1311), which is designed to determine the mobility of both organic and inorganic analytes present in liquid, solid, and multiphase wastes. The TCLP predicts if hazardous components of a waste are likely to leach out and become a threat to public health or the environment. Testing should always be done by a qualified laboratory and while analytical testing can be more expensive, it usually provides more accurate information on waste characteristics. Table 1 contains maximum concentrations for the toxicity characteristics for inorganic contaminants.

For more information on process knowledge and analytical testing, see [www.epa.gov/epaoswer/non-hw/indusd/chapters/chap2.pdf](http://www.epa.gov/epaoswer/non-hw/indusd/chapters/chap2.pdf) and [www.epa.gov/sw-846/index.htm](http://www.epa.gov/sw-846/index.htm).

### Mixed Waste

Mixed waste “contains both hazardous waste and source... or byproduct material subject to the Atomic Energy Act [AEA]...” (42 USC 6903.41). Mixed waste is regulated under both RCRA and AEA, and although highly unlikely, WTPs generating hazardous waste could have a mixed waste if the residuals also contain more than 0.05 percent by weight of uranium or thorium (i.e., source material).

A system generating hazardous waste does not have mixed waste if the amount of source material generated is an “unimportant quantity” (uranium or thorium makes up less than 0.05 percent by weight of the material), or if the waste contains only radium since radium is not considered source or by-product material when present in water treatment residuals unless it co-occurs with licensable source material such as uranium. Your primacy agency may have additional regulations for water treatment plant residuals containing radium.

Hazardous wastes containing source material exceeding the “unimportant quantity” limits, must be disposed of at a facility authorized to accept mixed waste. Because there are extremely limited mixed waste disposal options, generation of a mixed waste should be avoided if at all possible.

For additional information, see EPA’s *A System’s Guide to the Management of Radioactive Residuals from Drinking Water Treatment Technologies* (EPA 816-F-06-012) or contact your primacy agency.

2. Determine if your hazardous and/or non-hazardous waste contains any “free liquids” by having a lab perform the Paint Filter Liquids Test (PFLT) (EPA SW 846 Method 9095). Landfills cannot accept waste containing free liquids and therefore you will need to use an intermediate processing method (such as dewatering) to remove any liquids. Your system will need to find an appropriate method for disposing of the liquid residuals generated by the intermediate processing.

**Table 1: Maximum Concentration of Inorganic Contaminants for the Toxicity Characteristic**

Contaminant	Regulatory Level (mg/L)
Arsenic	5.0
Barium	100.0
Cadmium	1.0
Chromium	5.0
Lead	5.0
Mercury	0.2
Silver	5.0

Note: See 40 CFR 261.24 for other contaminants.

If your system is producing non-hazardous wastes, your disposal options for solid residuals are regulated under RCRA Subtitle D, while hazardous solid wastes are regulated under RCRA Subtitle C. Disposal options for both non-hazardous and hazardous liquids are regulated under the Safe Drinking Water Act (SDWA) Underground Injection Control (UIC) provisions or the Clean Water Act (CWA) regulations. See Step 3 for more information on disposal options.

**STEP 2: DETERMINE YOUR GENERATOR STATUS AND REQUIREMENTS**

In accordance with RCRA, hazardous waste generators are classified into categories based on the amount of hazardous waste produced monthly and the amount of hazardous waste stored on-site. Your generator status determines your requirements. See Table 2, below, for the definition of each generator group.

**Table 2: Generator Status and Requirements**

Status	Generation	Storage
<i>Conditionally Exempt Small Quantity Generator (CESQG)</i>	< 100 kg	< 1,000 kg
<i>Small Quantity Generator (SQG)</i>	100-1,000 kg	1,000-5,999 kg
<i>Large Quantity Generator (LQG)</i>	> 1,000 kg	> 6,000 kg

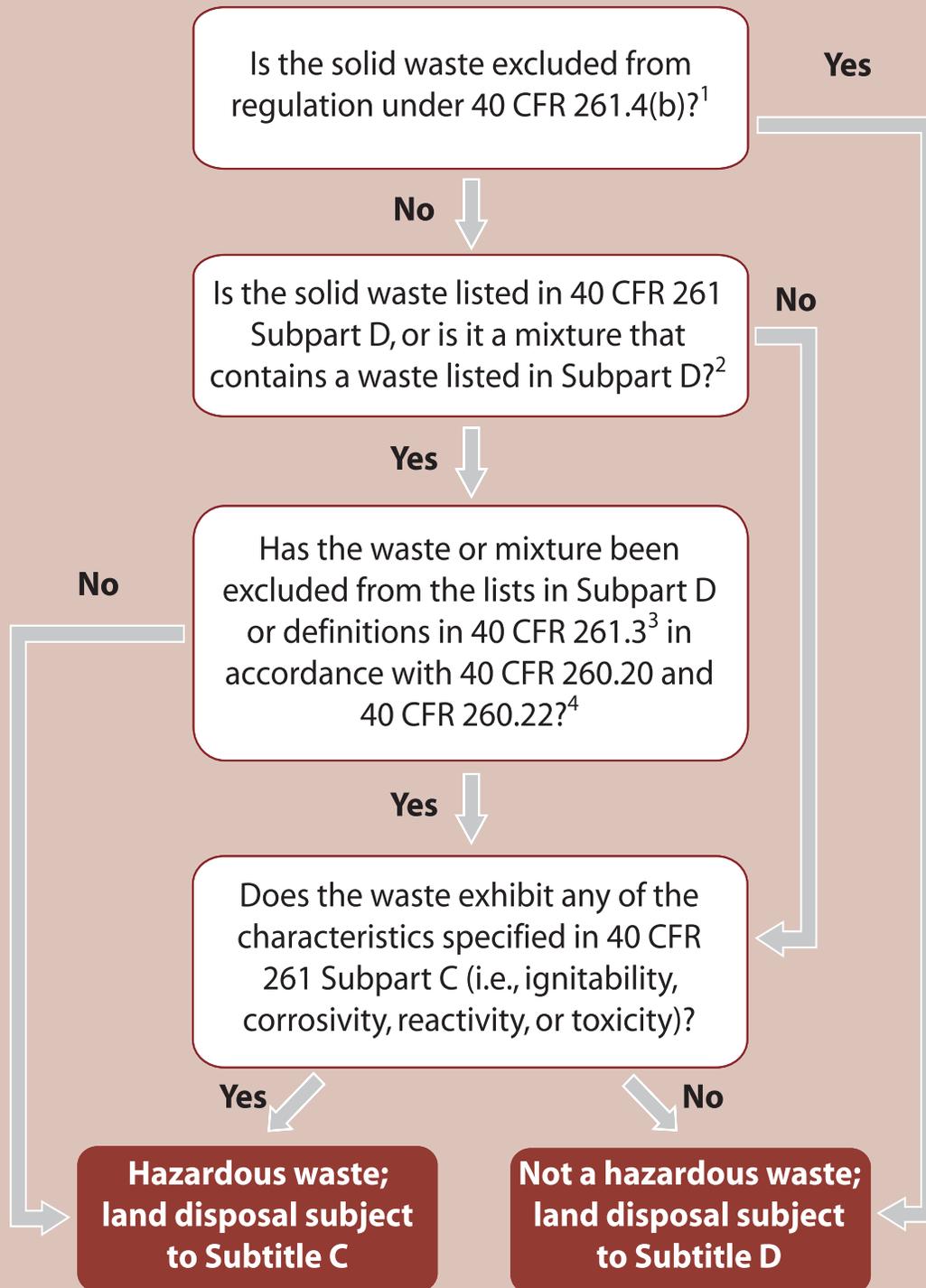
If you have obtained CESQG status, and you exceed either the generation or the storage limit in any given month, you will lose your CESQG status and must comply with more stringent requirements for SQGs or LQGs (40 CFR 262.10(b)).

**CESQGs are required under RCRA (40 CFR 261.5) to:**

1. Identify all hazardous waste that is generated.
2. Comply with the storage limit requirement (less than 1,000 kg) and maintain an inventory to track the amount of waste generated each month and stored on-site.
3. Ensure proper on-site or off-site waste treatment or disposal at a:
  - Licensed primacy agency hazardous waste facility
  - Permitted or interim status hazardous waste Treatment, Storage, and Disposal Facility (TSDF)
  - Primacy agency permitted, licensed, or registered solid waste disposal facility (including a municipal solid waste landfill)
  - Recycling facility
  - Universal waste facility

Not all primacy agencies recognize the CESQG category. Contact your primacy agency’s drinking water or hazardous waste program for more information.

## Decision Tree 1: Hazardous Waste Determination



<sup>1</sup> 40 CFR 261.4(b) lists solid wastes that are excluded from regulations as hazardous waste. Note that 40 CFR 261.4(a) lists materials that are not solid wastes and are thus excluded from regulation under RCRA. These materials include: domestic sewage; CWA point source discharge; irrigation return flow; Atomic Energy Act (AEA) source, special nuclear, or by-product material; or, in-situ mining waste.

<sup>2</sup> 40 CFR 261 Subpart D lists hazardous wastes subject to RCRA regulation.

<sup>3</sup> 40 CFR 261.3 includes the definition of hazardous waste as a solid waste that is not excluded from regulation in 40 CFR 261.4(b), and is listed in 40 CFR Subpart D, or exhibits a characteristic of hazardous waste identified in 40 CFR Subpart C (i.e., ignitability, corrosivity, reactivity, or toxicity).

<sup>4</sup> 40 CFR 260.20 and 260.22 provide an opportunity for any person to petition the EPA Administrator to modify or revoke any part of 40 CFR 261 (including a waste that is excluded from a particular facility from the lists in 40 CFR Subpart D).

## **STEP 2, continued**

If you generate or store enough waste to be considered a SQG or LQG, you will be subject to further RCRA regulations (40 CFR 262). These include: obtaining an EPA identification number (generally from the primacy agency); complying with waste accumulation and storage requirements; developing emergency plans; training employees; following the manifest system and Department of Transportation (DOT) requirements for off-site hazardous waste shipments; and recordkeeping and reporting requirements. SQGs and LQGs that plan on storing waste beyond certain time limits must also obtain a RCRA storage permit. Time limits vary according to waste quantity and factors, as described in 40 CFR 262.34.

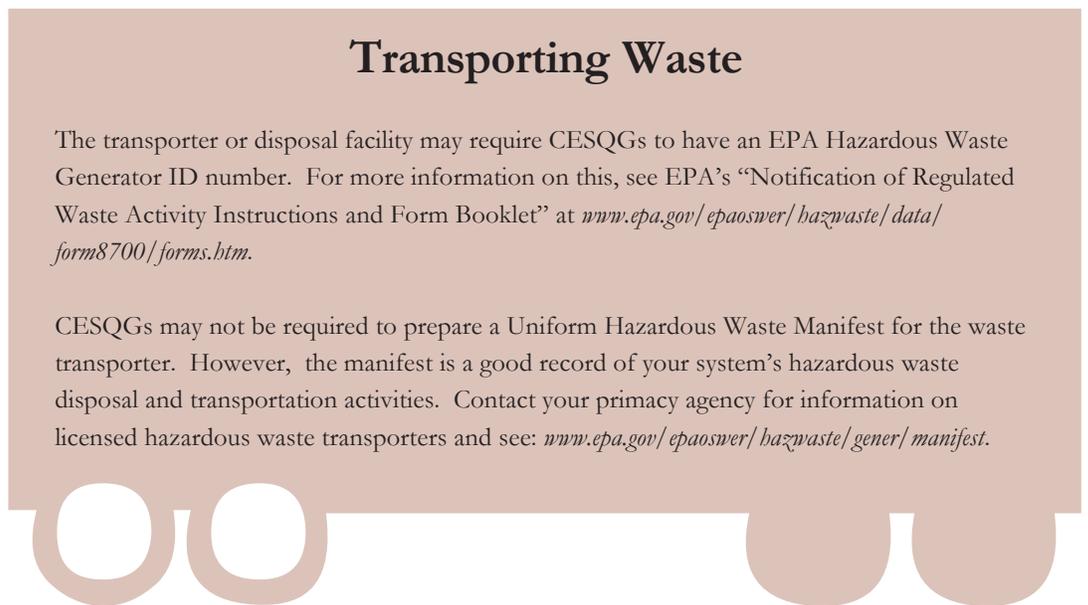
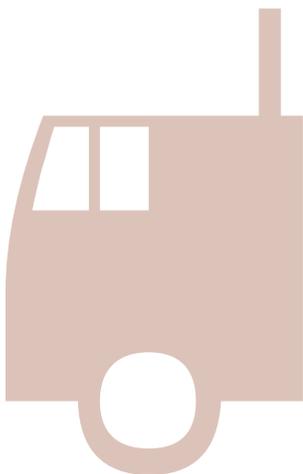
If your system is a CESQG, you are not required to comply with most of the regulations described above. However, you should follow safe management practices when storing hazardous waste on-site, including:

- Carefully labeling and sealing hazardous waste containers
- Maintaining and frequently inspecting the areas where hazardous waste is stored to minimize the chance of leaks
- Posting emergency response telephone numbers and making sure that there is an easily accessible telephone in or near the storage facility
- Ensuring that system staff are aware of the dangers and are properly trained to handle hazardous waste
- Preparing containers for transportation by packaging, labeling, and marking them according to DOT regulations (49 CFR 172; see [www.access.gpo.gov/nara/cfr/waisidx\\_02/49cfr172\\_02.html](http://www.access.gpo.gov/nara/cfr/waisidx_02/49cfr172_02.html))

## **Transporting Waste**

The transporter or disposal facility may require CESQGs to have an EPA Hazardous Waste Generator ID number. For more information on this, see EPA's "Notification of Regulated Waste Activity Instructions and Form Booklet" at [www.epa.gov/epaoswer/hazwaste/data/form8700/forms.htm](http://www.epa.gov/epaoswer/hazwaste/data/form8700/forms.htm).

CESQGs may not be required to prepare a Uniform Hazardous Waste Manifest for the waste transporter. However, the manifest is a good record of your system's hazardous waste disposal and transportation activities. Contact your primacy agency for information on licensed hazardous waste transporters and see: [www.epa.gov/epaoswer/hazwaste/gener/manifest](http://www.epa.gov/epaoswer/hazwaste/gener/manifest).



### STEP 3: DISPOSAL

The table below includes disposal options for hazardous and non-hazardous WTP residuals. Your disposal options (the type and concentration of contaminants, the volume of waste produced, etc.); and, federal, state, and

Liquid Residuals (Brine, Backwash Water, Rinse)			
Disposal Option	Waste Type	Applicable Authority	
Discharge directly to surface waters of the U.S. <sup>1</sup>	Non-hazardous	CWA	<ul style="list-style-type: none"> <li>Your system must have a Elimination System (NPDES)</li> </ul>
Discharge to a Publicly Owned Treatment Works (POTW)	Hazardous & non-hazardous	CWA	<ul style="list-style-type: none"> <li>You must meet Pretreatment Technically Based Local Limits or the POTW</li> <li>Waste mixed with domestic system to a POTW is not waste under RCRA</li> </ul>
Injection to a Class I UIC well	Hazardous, non-hazardous, and radioactive <sup>2</sup>	SDWA - UIC	<ul style="list-style-type: none"> <li>May be an option for hazardous few Class I facilities accept generated off-site</li> <li>Wells have stringent protective</li> </ul>
Injection to a Class V UIC well	Non-hazardous, non-radioactive		<ul style="list-style-type: none"> <li>Not an option for wastes</li> </ul>
Solid Residuals (Spent Resins, Spent			
Disposal Option	Waste Type	Applicable Authority	
Municipal & industrial landfills	Hazardous & non-hazardous	RCRA	<ul style="list-style-type: none"> <li>Waste cannot contain free liquids</li> <li>Solids may need to be dewatered</li> </ul>
Hazardous waste landfill	Hazardous & non-hazardous	RCRA	<ul style="list-style-type: none"> <li>Waste cannot contain free liquids</li> <li>Solids may need to be dewatered</li> </ul>

<sup>1</sup> Direct discharges subject to NPDES permits are not solid or hazardous waste under RCRA. Wastewater that is stored the definition in 40 CFR 260.10 would be exempt from RCRA permitting requirements.

<sup>2</sup> In accordance with UIC regulations (10 CFR 20 Appendix B, Table 2, Column 2), EPA considers wastes with the 300 pCi/L for uranium.

will depend on the availability of waste disposal facilities; the characteristics of the waste (i.e., liquid vs. local regulations. It is important to check with your primacy agency before choosing any disposal options.

### Water, Acid Neutralization Water, Concentrate)

#### Key Considerations

National Pollutant Discharge permit

- An appropriate and accessible receiving waterbody must be available

Program prohibitions and the (TBLs) established by your state

- The POTW can refuse to accept waste that would interfere with or pass through the POTW treatment process and cause a violation of the POTW's NPDES permit

sewage that passes through a sewer considered a solid or hazardous

- Your system must meet any POTW requirements and state permitting requirements

and radioactive wastes but very hazardous or mixed waste

- Can be expensive to construct, operate, and monitor
- Acceptable geology not always available
- States may be more stringent or may prohibit such class of injection well

requirements

considered hazardous

- Most likely not an option for radioactive waste because demonstration of the non-endangerment standard (40 CFR 144.12) for shallow injection will be difficult

### Filter Media, Spent Membranes, Sludge)

#### Key Considerations

prior to disposal

- Hazardous waste from CESQGs may be disposed of in municipal or industrial landfills that meet certain design regulations

prior to disposal

- Certain generator classes must meet Land Disposal restrictions

before discharge is a solid waste under RCRA and may be a hazardous waste; however, wastewater treatment tanks that meet following concentrations of radium and uranium to be radioactive: 60 pCi/L for radium-226, 60 pCi/L for radium-228, and

## Resources

### Documents

- *Guide for Industrial Waste Management*, EPA 530-R-03-001, April 2003  
([www.epa.gov/epaoswer/non-hw/industd/guide.htm](http://www.epa.gov/epaoswer/non-hw/industd/guide.htm))
- *How Does RCRA Work?*, EPA 530-E-00-001c, October 2000  
([www.epa.gov/epaoswer/general/manag-hw/e00-001c.pdf](http://www.epa.gov/epaoswer/general/manag-hw/e00-001c.pdf))
- *What Makes a Waste Hazardous?*, EPA 530-E-00-001e, October 2000  
([www.epa.gov/epaoswer/general/manag-hw/e00-001e.pdf](http://www.epa.gov/epaoswer/general/manag-hw/e00-001e.pdf))
- *RCRA Orientation Manual*, EPA 530-R-02-016, January 2003  
([www.epa.gov/epaoswer/general/orientat](http://www.epa.gov/epaoswer/general/orientat))
- *Reducing Risk from Waste*, EPA 530-K-97-004, September 1997  
([www.epa.gov/epaoswer/general/risk/risk.htm](http://www.epa.gov/epaoswer/general/risk/risk.htm))
- Department of Labor, *Occupational Safety and Health Administration Hazardous Waste Standards*  
([www.osha.gov/SLTC/hazardouswaste/standards.html](http://www.osha.gov/SLTC/hazardouswaste/standards.html))

### Web Sites

- EPA: [www.epa.gov](http://www.epa.gov)
- EPA Office of Ground Water and Drinking Water: [www.epa.gov/safewater](http://www.epa.gov/safewater)
- EPA Office of Solid Waste: [www.epa.gov/osw](http://www.epa.gov/osw)
- EPA Office of Air and Radiation: [www.epa.gov/radiation](http://www.epa.gov/radiation)
- EPA Office of Wastewater Management, NPDES: [cfpub.epa.gov/npdes](http://cfpub.epa.gov/npdes)
- RCRA Online: [www.epa.gov/rcraonline](http://www.epa.gov/rcraonline)
- Regulations and Standards - RCRA: [www.epa.gov/epaoswer/osw/laws-reg.htm#RCRA](http://www.epa.gov/epaoswer/osw/laws-reg.htm#RCRA)
- Underground Injection Control: [www.epa.gov/safewater/uic.html](http://www.epa.gov/safewater/uic.html)
- Paint Filter Liquids Test: [www.epa.gov/epaoswer/hazwaste/test/pdfs/9095a.pdf](http://www.epa.gov/epaoswer/hazwaste/test/pdfs/9095a.pdf)
- Department of Transportation, Office of Hazardous Materials Safety: [hazmat.dot.gov](http://hazmat.dot.gov)
- U.S. Nuclear Regulatory Commission: [www.nrc.gov](http://www.nrc.gov)

**Safe Drinking Water Hotline**  
**1-800-426-4791**