Frequently Asked Questions:
Regulation of Used Cathode Ray Tubes (CRTs) and CRT Glass

These FAQs are intended for entities that collect, store, recycle, treat, and/or dispose used CRTs and CRT glass in the United States. The FAQs describe how used CRTs and CRT glass must be managed under the federal hazardous waste regulations.

1. How does U.S. EPA regulate recycling of used CRTs and CRT glass under the RCRA hazardous waste regulations?

Under the CRT exclusion (also known as the "CRT rule"), used CRTs and CRT glass being recycled that meet the requirements of the exclusion are conditionally excluded from the hazardous waste regulations. As long as the used CRTs and CRT glass meet the requirements of this exclusion, they are not considered a solid or hazardous waste under the Resource Conservation and Recovery Act (RCRA). **(40 CFR 261.4(a)(22))**

Please note that the CRT exclusion applies only in RCRA-authorized states that have adopted the exclusion and states where EPA administers the RCRA program. In addition, state agencies may have more stringent requirements than the federal government, so it is important to also check your specific state regulations. Links to the state waste programs can be found at http://www.epa.gov/wastes/wyl/stateprograms.htm. Facilities handling CRTs also may be subject to other federal and state laws and regulations, including those covering worker safety and transportation.

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2. Which materials are covered by the CRT exclusion?

The CRT exclusion covers three different types of CRT materials:

- **Used, intact CRTs** - CRTs whose vacuum has not been released.
- **Used, broken CRTs -** CRT glass removed from the CRT housing or casing whose vacuum has been released. This category includes unprocessed CRT glass.
- **Processed CRT glass –** CRT glass that has been sorted in preparation for recycling.

Under the CRT exclusion, different requirements apply to different categories of CRT materials.

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3. What export requirements apply to CRTs and CRT glass?

Used, intact CRTs sent for reuse, are subject to a one-time export notification. **(40 CFR 261.41)** Exporters must send the notification to the appropriate EPA Regional Administrator to inform the

EPA Regional Office that they intend to export intact CRTs for reuse, and must provide contact information and a statement that they are exporting the CRTs for reuse. The exporters must keep copies of normal business records demonstrating that each shipment of exported CRTs will be reused. Exporters must retain records for three years.

Used CRTs (either intact or broken) exported for recycling are subject to export notice and consent requirements. **(40 CFR 261.40** and **40 CFR 261.39(a)(5)** respectively) Exporters must send the export notice to EPA at least 60 days prior to export. The notice may cover exports occurring during a 12-month or shorter period, and must include address and contact information about the exporter and foreign recycler, a description of the recycling, the planned frequency of export shipments, means of transport, total quantity of CRTs proposed to be shipped over the export period, and information about any transit countries. Exporters shipping used CRTs for recycling under the CRT exclusion are prohibited from shipping until they have received an EPA Acknowledgement of Consent (AOC) letter documenting the consent EPA has received from the country of import and any transit countries. A copy of the AOC letter must accompany each export shipment. If a shipment cannot be delivered to the recycler listed in the notice for any reason, the exporter must notify EPA of the need to change the destination recycler and obtain consent prior to shipping to a different recycler.

Processed CRT glass exported for CRT glass making or lead smelting is not subject to export requirements of the CRT exclusion. CRT glass destined for export must still, however, meet the requirements for processed CRT glass in 40 CFR 261.39(c). Specifically, under the CRT exclusion the generator must be able to demonstrate that the exported CRT glass is being used for CRT glass making or lead smelting and not disposed in the receiving country, and that it is not being speculatively accumulated prior to being exported.

Processed CRT glass excluded under a different solid waste exclusion (for example, CRTs being used as an effective substitute as a fluxing agent at a copper smelter) are not subject to hazardous waste export requirements. (See **FAQ #11** for a discussion of permissible final uses for CRT processed glass). However, generators claiming a solid waste exclusion must be able to demonstrate that their CRT glass meets the terms of the exclusion. **(40 CFR 261.2(f))**

Note: In March 2012, EPA proposed revisions to the export provisions of the CRT exclusion in order to better track exports of CRTs and ensure safe management of these materials abroad. If the proposal is made final, the Agency will update this FAQ accordingly.

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4. What other requirements apply to CRTs and CRT glass?

Used, intact CRTs are conditionally excluded from hazardous waste regulation within the United States as long as they are not disposed or speculatively accumulated (i.e., accumulated with no assurance that they will actually be reused or recycled; see **FAQs #6 through #10** for more information on speculative accumulation). **(40 CFR 261.4(a)(22)(i))**

Used, broken CRTs are conditionally excluded from hazardous waste regulation within the United States if they are (1) stored in a building with a roof, floor and walls; or placed in an container that meets the regulatory requirements, (2) labeled according to the regulatory requirements, (3) transported in a container that meets the regulatory requirements, (4) not speculatively accumulated, (5) processed only in a building with roof, floor and walls, and (6) do not undergo activities that use temperatures high enough to volatize lead from CRTs **(40 CFR 261.39(a) and (b)).**

Processed CRT glass is conditionally excluded from hazardous waste regulation under the CRT exclusion so long as (1) it is sent for recycling at a CRT glass manufacturer or a lead smelter, and (2) it is not speculatively accumulated. **(40 CFR 261.39(c))**

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5. What are the storage requirements for broken CRTs?

Used, broken CRTs must be either stored in a building with a roof, floor, and walls, or placed in a container (i.e., a package or vehicle) that is constructed, filled, and closed to minimize releases to the environment of CRT glass (including fine solid materials). **(40 CFR 261.39(a)(1))**

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6. How are CRTs and CRT glass shown not to be speculatively accumulated?

CRTs and CRT glass are not speculatively accumulated if (1) the person accumulating the used CRTs and CRT glass can show that the material is potentially recyclable and has a feasible means of being recycled and (2) that during the calendar year the amount of material that is recycled, or transferred to a different site for recycling, equals at least 75% by weight or volume of the amount of that material accumulated at the beginning of the period. **(40 CFR 261.1(c)(8))** Further discussion of the speculative accumulation requirement can be found in 50 FR 634-637 (January 4, 1985).

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7. In the speculative accumulation regulation, what does it mean for a person to "show that the material is potentially recyclable and has a feasible means of being recycled"?

In general, a material has a feasible means of being recycled if there is a known market for the material – that is, a person who is managing used CRTs or CRT glass under the exclusion has identified a recycler who will accept and recycle the material, or the person can recycle the material itself.

On the other hand, all materials stored with a legitimate expectation of eventually being recycled but for which there is no known recycling market or disposition, or no feasible means of recycling, are considered wastes. (50 FR 634)

A person accumulating hazardous secondary materials would have the burden of proving that there is a feasible means of recycling. This ordinarily will require identification of actual recyclers and recycling technology, location of the recycler, and relative costs associated with recycling. (50 FR 634)

In addition, EPA believes that material for which generators could demonstrate that on-going developmental work will lead to recycling at a future date should be considered to be accumulated speculatively. EPA believes that materials that are not known to be recyclable (or not feasibly recyclable in the hands of a particular generator) are wastes immediately. (50 FR 635)

Additionally, EPA notes that in order to demonstrate that used CRTs and CRT glass are not being speculatively accumulated, both parts of the provision must be met – that is, (1) the person accumulating the used CRTs and CRT glass can show that the material is potentially recyclable and has a feasible means of being recycled and (2) that during the calendar year the amount of material that is recycled, or transferred to a different site for recycling, equals at least 75% by weight or volume of the amount of that material accumulated at the beginning of the period.

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8. How is the minimum requirement of 75% material recycled in one year calculated?

The minimum requirement of 75% material recycled applies to each material of the same type, can be calculated either by weight or by volume, and is based on the total inventory of that material accumulated for recycling as of January 1. For example, a company with a total of 100 tons of CRT glass stockpiled for recycling on January 1st must recycle, or transfer for recycling, at least 75 tons of CRT glass before the end of the calendar year.

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9. What about the remaining 25%?

CRTs or CRT glass that are not recycled during the calendar year count towards the total inventory for the purpose of speculative accumulation calculations for the following calendar year.

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10. Does CRT glass that has been cleaned and sorted still have to follow the speculative accumulation limits?

Yes. Processed CRT glass that contains enough lead for it to exhibit the hazardous waste characteristic is subject to the limits on speculative accumulation. **(40 CFR 261.2(c)(4), 40 CFR 261.2(e)(2)(iii)** and **40 CFR 261.39(c))**

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11. What are permissible final uses for processed CRT glass?

The CRT exclusion only applies to processed CRT glass sent for recycling at a CRT glass manufacturer or a lead smelter. **(40 CFR 261.39(c))**

In some cases, under a different exclusion, processed CRT glass may be used as an ingredient in an industrial process to make a product, provided that the materials are not being reclaimed, or it may be used as an effective substitute for a commercial product. **(40 CFR 261.2(e)(1)(i) and (ii))** For example, CRT glass may be used as an effective substitute for a fluxing agent at copper smelters (see EPA's memo dated April 24, 2013). A company may wish to consult its state regulatory authority to help determine if the final use for their CRT glass would fit the requirements of this exclusion.

However, when CRTs or CRT glass are used in a manner constituting disposal (i.e., used in a manner that results in the product utilizing them being applied or placed into or onto the land), then the "use constituting disposal" (UCD) regulations apply. **(40 CFR 261.2(e)(2)(i)** and **40 CFR 261.39(a)(4) and (d))** The UCD regulations require the hazardous material to be bound into the new product (i.e., inseparable by physical means) and must meet hazardous waste treatment standards for each hazardous constituent present (e.g., lead, cadmium, chromium, etc.). **(40 CFR 266.20)**

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12. What about used CRTs or CRT glass from households, or from businesses that generate less than 100 kg of hazardous waste per month?

Used CRTs discarded by households are considered "household hazardous waste" and are exempt from hazardous waste regulations. **(40 CFR 261.4(b)(1))** CRTs discarded by businesses that

generate less than 100 kg (220 lbs) of (non-acute) hazardous waste per month are considered "conditionally exempt small quantity generator" (CESQG) wastes and are subject to reduced hazardous waste requirements. **(40 CFR 261.5)**

However, if these materials – that is used CRTs or CRT glass from households or from CESQGs – are not kept separate from the conditionally excluded CRT materials, then the entire comingled pile would be subject to the CRT exclusion requirements or the hazardous waste regulations.

The EPA generally encourages recycling of electronics products as they are made from valuable resources and highly engineered materials, including metals, plastics, and glass, all of which require energy to mine and manufacture them. Reusing and recycling consumer electronics conserves our natural resources and avoids air and water pollution, as well as greenhouse gas emissions that are caused by manufacturing virgin materials.

Local municipality or solid waste collection programs, electronics manufacturers and retailers of electronics products may offer electronics collection programs or events for households. To find more information on electronics donation and recycling opportunities in your area, please visit our Where Can I Donate My Old Computer and Other Electronic Products? page.

Moreover, entities that collect CRTs and CRT glass from households or CESQG businesses are subject to the general prohibition on open dumps **(40 CFR part 257)** and may become subject to RCRA, Superfund, or State clean-up authorities if mismanaged.

Please note that state agencies may have more stringent requirements than the federal government regarding household hazardous waste and CESQGs, so it is important to also check your specific state regulations. Links to the state waste programs can be found at http://www.epa.gov/wastes/wyl/stateprograms.htm.

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13. If the CRT glass is accumulated in a building, does that eliminate any clean-up liability?

Managing the CRT glass piles in a building reduces liability by preventing potential lead contamination of the environment, which can be costly to clean up. However, if the indoor CRT glass pile becomes abandoned (for example, if the recycler goes out of business), or if the CRT glass is released, or poses a threat of release, from the building, businesses or facility owners/operators may become liable for the removal and proper management of the glass under RCRA, Superfund, or State clean-up authorities.

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14. How can I make sure that the recycler is properly managing the CRTs and CRT glass I send there?

Before you send your CRTs or CRT glass to a recycler, it is a good idea to take steps to verify they are an environmentally responsible recycler. Information that can help you decide whether a recycler will responsibly recycle hazardous secondary materials (including CRTs) include whether the recycler can provide records for the final recycling of their hazardous secondary materials and can document that environmental, health, and safety management systems are in place to ensure environmentally sound management practices. For more information, see EPA's *Choosing a Responsible Recycler: A Guide for Generators of Hazardous Secondary Materials* (EPA530-F-09-018) http://www.epa.gov/osw/hazard/recycling/pubs/responsible-recycler.pdf.

In addition, there is a range of tools specific to used electronics to help ensure they are recycled in an environmentally sound manner, including accredited third-party certification programs, best practices, and increased knowledge and transparency of the companies and practices along the recycling chain. Currently, there are two voluntary programs run by independent organizations that certify electronics recyclers: R2 and e-Stewards. *(References to specific certification websites is for informational purposes only and is not a reflection of EPA endorsement).*

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15. The recycler where I was planning on sending my used CRTs or CRT glass is no longer accepting them. What can I do now?

If circumstances prevent you from recycling 75% of your used CRTs or CRT glass inventory before the calendar year, but you will be able to recycle a sufficient amount the following calendar year, you may apply for a variance from the speculative accumulation prohibition using the provisions found at **40 CFR 260.31(a)**. Variances are granted on a case-by-case basis by the authorized state; please contact your state environmental agency for more information.

Otherwise, you must manage your used CRTs or leaded CRT glass as hazardous waste and send it for proper treatment and disposal in a RCRA hazardous waste permitted facility. CRT materials that are managed as hazardous waste do not count towards speculative accumulation limits, but would count towards the monthly total used to determine a facility's hazardous waste generator status per **40 CFR 261.5(c) and (d)** and, unless CESQG, must meet the applicable hazardous waste requirements in **40 CFR part 262.**

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16. What requirements apply to CRT processed glass that does not fail the toxic characteristic for hazardous waste (which generally includes CRT panel glass)?

CRT processed glass is glass that has been broken and sorted into the different glass portions of the CRT (panel, funnel, and frit line) which are classified according to chemical composition, especially by the amount of lead contained.

CRT processed glass that does not fail the toxic characteristic for hazardous waste (which generally includes panel glass) is not a RCRA hazardous waste and thus is not subject to the RCRA hazardous waste requirements, including the regulations in 40 CFR 261.39(c) and (d). (We would note that each generator is responsible for making a hazardous waste determination pursuant to 40 CFR 262.11.)

However, CRT processed glass that does fail the toxic characteristic for hazardous waste (which generally includes funnel glass) is subject to the conditions of the CRT exclusion at 40 CFR 261.39(c) or (d) or to the conditions of another exclusion from the definition of solid or hazardous waste (such as the use/reuse exclusion under 40 CFR 261.2(e)). To the extent that CRT processed glass does not meet the conditions of an exclusion from the definition of solid and hazardous waste, the CRT processed glass would be subject to the applicable hazardous waste regulations at 40 CFR parts 261 through 265 and 268.

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17. Do land disposal requirements (LDRs) apply to used CRTs and CRT processed glass?

Land Disposal Requirements (LDRs) are found in 40 CFR part 268 and require waste handlers to treat hazardous waste or meet specified levels for hazardous constituents (e.g., lead) before disposing of or placing the waste into or onto the land. Therefore, LDRs would only apply if the used CRTs or CRT processed glass that fail the toxic characteristic for hazardous waste are being disposed of on the land or will be placed into or onto the land (i.e., landfilled or recycled as "use constituting disposal" under 40 CFR part 266, subpart C).

CRT processed glass that does not fail the toxic characteristic for hazardous waste after sorting is not a hazardous waste and, therefore, LDRs do not apply even if the CRT processed glass is land disposed.

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18. What requirements apply to treatment of hazardous CRT glass?

The generator of the used CRTs may treat their hazardous CRT glass to render it non-hazardous in an on-site hazardous waste generator accumulation unit (e.g., tank) without a hazardous waste

permit provided they are in compliance with the applicable hazardous waste generator requirements in 40 CFR 262.34, and provided that the treatment is not thermal treatment. Otherwise, treatment of the hazardous CRT glass is subject to the hazardous waste permitting requirements of 40 CFR parts 264, 265, and 270.

Please note that state agencies may have more stringent requirements than the federal government regarding treatment in generator accumulation tanks or containers, so consider checking with your specific state regulations at http://www.epa.gov/wastes/wyl/stateprograms.htm.

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19. Can treated CRT glass be disposed in a non-hazardous waste landfill?

Hazardous CRT glass that has been treated to meet the applicable land disposal restrictions in 40 CFR part 268 and no longer exhibits a hazardous waste characteristic may be disposed in a non-hazardous waste landfill. However, state agencies may have more stringent requirements regarding disposal of CRT glass, so it is important to check your specific state regulations. Links to the state waste programs can be found at http://www.epa.gov/wastes/wyl/stateprograms.htm.

(See FAQ #12 regarding used CRTs or CRT glass from households, or from businesses that generate less than 100 kg of hazardous waste per month.)

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20. How are regulatory violations discovered at entities that collect, manage, or recycle CRTs and how do I report one?

Violations may be discovered from an on-site inspection of a facility by qualified inspectors or a review of the information EPA or the states require to be submitted. Violations may also be discovered by tips/complaints received by the Agency from the public. Violations discovered as a result of any of these activities may lead to civil or criminal enforcement.

Suspected violations can be reported to your local state environmental agency. Links to the state waste programs can be found at http://www.epa.gov/wastes/wyl/stateprograms.htm. Additionally, suspected violations of federal regulations can be reported to EPA at http://www.epa.gov/tips/.

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21. How are violations addressed and where can I find information?

Violations may be addressed in a number of ways from warnings to notices of violations to formal civil or criminal enforcement actions. Civil enforcement may result in a civil administrative or

judicial action. Completed enforcement and inspection data are maintained in a national database that is accessible to the public through the Enforcement and Compliance History Online (ECHO) system. Status of enforcement cases are not shared with the public while an active investigation is being conducted. Enforcement cases are generally not announced to the public but the information for federal cases that are completed can be found on EPA's website (http://www2.epa.gov/enforcement/cases-and-settlements). For information on state enforcement cases, refer to that specific state's web site. Links to the state waste programs can be found at http://www.epa.gov/wastes/wyl/stateprograms.htm.

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22. Who should I contact if I need help complying with the CRT exclusion?

If you have questions about your specific circumstances, you should contact your state environmental agency. Links to the state waste programs can be found at http://www.epa.gov/wastes/wyl/stateprograms.htm.

For more information on the federal regulation of CRTs, please contact Tracy Atagi at 703-308-8672 or atagi.tracy@epa.gov or Amanda Kohler at 703-347-8975 or kohler.amanda@epa.gov.

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For more information on the regulation of CRTs in the State of Mississippi, please contact Reese Yontz at 601-961-5035 or reese_yontz@deq.state.ms.us or Mark Williams at 601-961-5304 or mark_williams@deq.state.ms.us.

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