



ASTSWMO, Providing Pathways to Our  
Nation's Environmental Stewardship Since 1974

## **ASTSWMO Position Paper on Cathode Ray Tubes Management**

### **Background**

Due to the fast-paced changes in technology and consumer interest in buying new electronic products, many States are seeing an increase in the amount of older electronic items being discarded. Monitors and televisions with cathode ray tube (CRT) technology are a growing concern for the States. CRT units can contain a variety of toxic metals, such as barium, lead, and cadmium. Therefore, improper or uncontrolled disposal of these devices can have an adverse impact to the environment.

Televisions and monitors are primarily composed of an outer plastic case, electronic and metal components and the CRT. The glass in CRTs typically contains enough lead to require managing it as hazardous waste under certain circumstances. The U.S. EPA promulgated the conditional exclusion included under 40 CFR part 261.4(a)(22) of the federal hazardous waste management standards for CRTs and CRT glass destined for recycling to increase the collection and recycling of CRTs, and to divert CRTs from landfills. The recyclable metals within a CRT are copper, high grade wire, aluminum and stainless steel. CRT glass can be used to make new CRT glass, used as a fluxing agent in smelting, reclaimed for lead content or used as an ingredient to make ceramic tile for use in construction.

For a number of years, the recycling of CRTs and CRT glass was readily available and successful. But the current state of CRT recycling is different. The above-mentioned options for recycling CRTs and CRT glass are still available, however, the throughput capacity for the recycling options has decreased in recent years and no longer meets the current demand. Further, there are no new recycling alternatives available. As a result, stockpiles of used CRTs are being created by electronic recyclers due to the disappearance of the glass-to-glass reuse market, limited capacity for recycling CRT glass in the United States, and low interest in export options.

Fourteen States informed ASTSWMO that they are aware that CRTs or CRT glass are currently stockpiled in their State. The total amount of CRTs and CRT glass stockpiled in these States is estimated to be 540,000,000 pounds. Eleven of the known stockpiles are estimated to contain over 2,500,000 pounds of CRTs or CRT glass; the largest known stockpile is believed to contain 342,000,000 pounds of CRT glass. In addition, over the last two years, nine States have overseen the removal of approximately 52,000,000 pounds of CRTs and CRT glass.

The Association of State and Territorial Solid Waste Management Officials (ASTSWMO) presents this position paper to propose regulatory changes that it believes should be made to facilitate better and more protective management of CRTs.

### ***How are CRTs currently regulated?***

- ***Household CRTs***

Discarded CRTs from households are generally considered household hazardous wastes not subject to federal management and disposal requirements, but they are subject to State specific non-hazardous waste disposal requirements. A number of States have laws that limit or prohibit the disposal of certain electronic devices, including CRTs, in non-hazardous waste landfills.

- ***Business CRTs***

Discarded CRTs from businesses are required to be evaluated by the generator to determine if they meet the definition of hazardous waste. Generally, CRTs contain enough lead in the CRT glass to be classified as a characteristic hazardous waste, particularly the funnel glass and frit portions. Therefore, the CRTs must be managed as a conventional hazardous waste or in accordance with the conditional exclusion for CRTs. In addition, in eleven States, CRTs may be managed as a State-specific universal waste.

Under the conditional exclusion, used intact and broken CRTs are not regulated as a hazardous waste unless they are disposed, stored in violation of the speculative accumulation provision or used in a manner constituting disposal (effectively, any use on the land). Broken CRTs have additional conditions for storage, labeling, and transport.

However, if previously excluded CRT glass must be disposed in either a hazardous or non-hazardous landfill it must be evaluated to determine if it is a hazardous waste. If the CRT glass is a hazardous waste, the glass must be treated to meet the land disposal restrictions (LDR) treatment standard for lead in 40 CFR Part 268 (or State equivalent regulation), which is currently 0.75 mg/l.

Further, if an entity wants to use hazardous processed CRT glass as an ingredient to make a product that is placed on the land, the processed CRT glass is no longer excluded from the hazardous waste rules. It is subject to the use constituting disposal requirements in 40 CFR part 266 subpart C which, in part, requires the resulting product to meet the LDR treatment standards and the recycler, if not the generator, needs to obtain a hazardous waste permit for the storage of the CRT glass.

- ***Household CRTs Co-Managed with Business CRTs***

The CRTs from households can be co-mingled and recycled with CRTs from businesses under the hazardous waste conditional exclusion for CRTs. However, such CRTs would be subject to all the requirements of the exclusion.

## Issues

ASTSWMO has identified four issues that present impediments to proper recycling or disposal of CRTs:

- 1) LDR restrictions limit options for use or disposal on land.
- 2) Innovative or alternate recycling options are needed, and the conditional exclusion must be modified accordingly.
- 3) A risk assessment is needed comparing landfill disposal versus recycling.
- 4) The conditional exclusion limits recycling involving final use on land.

These issues, and ASTSWMO's positions, are presented below.

### Issue #1

The current hazardous waste regulatory framework subjects processed CRT glass to the LDR treatment standards due to its lead content when disposed or used on the land. This limits the recycling options that are available for the CRT glass.

### Discussion

CRTs generated by businesses are considered a solid waste (as broadly defined under the Resource Conservation and Recovery Act, encompassing both hazardous and non-hazardous wastes), subject to hazardous waste determinations. While it is up to the waste generators to make the hazardous waste determinations, it is likely that CRTs contain enough lead to cause an intact computer monitor or television to fail the Toxicity Characteristic Leaching Procedure (TCLP), making it a hazardous waste and subject to the LDRs when disposed or recycled in a manner constituting disposal. In order for hazardous CRT glass to be disposed or used on the land, it must pass the TCLP for lead and it must meet the LDR treatment standard for lead which is 0.75 mg/l. It is the LDR treatment standard that limits recycling options for CRT glass.

Several States have expressed the desire to allow disposal of CRTs at Subtitle D landfills or the use of CRT glass as operational cover. These States believe that it is more protective of human health and the environment to manage CRT glass in local permitted lined landfills equipped with leachate collection systems than through illegal abandonment and uncontrolled disposal in the United States or internationally.

Stockpiled and abandoned CRTs and CRT glass, especially those that are vandalized, pose a greater threat to human health and the environment than the disposal of CRTs and CRT glass in engineered landfills. This is because lead and other metal releases from the stockpiles are not controlled and become free to disperse into the environment contaminating the land. Engineered landfills contain and collect releases through the use of operational cover and leachate collection systems.

## Position

It is the position of ASTSWMO that U.S. EPA should reconsider the current LDR restrictions applicable to CRT glass and investigate options and regulatory changes to allow CRT glass that has been treated to levels below the TCLP, but does not meet the LDR treatment standard for lead, to be disposed in Subtitle D landfills or used in Subtitle D landfills as operational cover. A number of States have in place oversight and approval processes for the use of wastes as operational cover at Subtitle D landfills. These programs evaluate the use of the waste to minimize potential short and long term adverse impacts to human health and the environment, the statutory standard under RCRA Subtitle C for the land disposal of hazardous wastes. Such an approval process can be used to tailor LDR treatment standards for the land disposal of CRT glass while still meeting the statutory standard of RCRA Subtitle C. ASTSWMO believes that such an approach will promote safe and accessible management options for CRT glass; an approach that is far better than the uncontrolled open disposal and stockpiling occurring in the United States or the unsafe disposal practices that occur abroad.

## Issue #2

Innovative and alternate recycling options for CRT glass need to be actively encouraged, developed and investigated by U.S EPA.

## Discussion

The general position of ASTSWMO is to **Reduce, Reuse, or Recycle** waste while maintaining conditions that are protective of human health and the environment; however, options to reduce or reuse CRTs are not viable, leaving recycling (with limited capacity) and disposal as currently available CRT glass management options.

Reduction of CRTs and CRT glass is not possible because these units are already in use and present in commerce and have been replaced by non-CRT technology; additionally, new CRTs are not manufactured or sold in the United States. As used CRTs are collected and managed, there will eventually be a decline in the number of CRTs, however, it is estimated there are 232.2 million CRT units that need to be managed through 2023 and it will take years to fully recycle all the CRTs.

The recycling market for CRT glass in the United States has limited options and capacity, and recently, the market for CRT glass has been challenging at best. This has resulted in CRT glass being stockpiled in large amounts and open dumped because of the lack of a recycling market. There are some export markets for the recycling of CRT glass; however, there is also reluctance to export CRT glass due to past problems with CRT glass not being appropriately managed abroad.

## **Position**

With no reduce or reuse options and only limited recycling options currently available within the United States, new recycling options of CRTs need to be developed, evaluated and encouraged by U.S. EPA. In addition, new recycling technologies need to be included as appropriate methods of management under the CRT conditional exclusion for CRT glass. Currently the CRT exclusion is limited to CRT manufacturing (which is no longer a viable option) and lead smelting (which has a limited recycling capacity).

## **Issue #3**

The CRT conditional exclusion limits hazardous CRT glass from being recycled in a manner constituting disposal. Further, the manufacturer of a CRT glass containing product that is used on the land is subject to the hazardous waste permitting requirements in certain circumstances.

## **Discussion**

CRTs undergoing processing are not hazardous waste in most States if they meet the conditional exclusion found in 40 CFR part 261.4 (a)(22). However, the exclusion limits hazardous CRT glass processed under the exclusion from being recycled into a product that is used on the land to meet the use constituting disposal requirements of CFR part 266 subpart C. This prohibition applies to the CRT glass even if it has been treated to below the TCLP levels.

CRT panel glass (the CRT screen) is typically lower in lead concentration than other CRT glass components and may pass the toxicity characteristic, especially if it is separated carefully from the CRT during initial processing to prevent mixing with higher-lead-containing frit and funnel glass. Non-hazardous panel glass can also be processed into an aggregate for use in construction or used as an ingredient to make reflective beads that are often used on highways. It may also be possible to recycle higher-lead glass also from dismantled CRTS in these ways if such glass has been treated to reduce lead leaching.

## **Position**

ASTSWMO recommends that U.S. EPA conduct a risk assessment to evaluate the potential risks to the environment posed by products containing CRT glass that are used on the land. If such products present no short or long term adverse impacts to the environment, U.S. EPA should reconsider whether the hazardous waste permitting requirements applicable to CRT glass recyclers making glass containing products used on the land are needed.

## **Issue #4**

Recycling and disposal options for CRTs are limited.

### **Discussion**

In many areas of the country, especially rural areas, there are no local opportunities available to recycle CRTs, and CRTs must be shipped long distances to be recycled. Considering lifecycle factors including, but not limited to fuel production and vehicle emissions, the cumulative adverse effects on the environment and impacts on human health and the environment from recycling CRTs may be greater than those resulting from direct landfill disposal. Landfill disposal is a controlled disposal method utilizing engineered liner and leachate collection systems, air emission controls, and appropriate treatment of any leachate that is generated, thus minimizing the release of constituents to the environment.

### **Position**

ASTSWMO believes that U.S. EPA should investigate potential circumstances and conditions related to disposal options, such as municipal landfills or monofills, where the land disposal of CRTs can be as protective of human health and the environment as the options currently allowed. U.S. EPA should also consider revising the CRT rule to give States the ability to authorize land disposal of CRTs, including CRTs generated by business and industry, at lined municipal solid waste Subtitle D landfills, possibly combined with other special handling procedures (immediate burial, designated disposal area, etc.) as appropriate.

### **Conclusion**

ASTSWMO believes that in order to facilitate CRT management that is protective of human health and the environment, U.S. EPA needs to consider modifying or waiving certain provisions in the hazardous waste rules including the 40 CFR part 261.4(a)(22) conditional exclusion and the LDRs. As discussed above, this evaluation will also require that additional risk analysis be performed by U.S. EPA. The ASTSWMO Hazardous Waste and Materials Management Subcommittees stand ready to provide input, support and assistance to U.S. EPA as U.S. EPA pursues the recommendations in this position paper.

Approved by the ASTSWMO Board of Directors on April 25, 2017 in Cleveland, OH.