

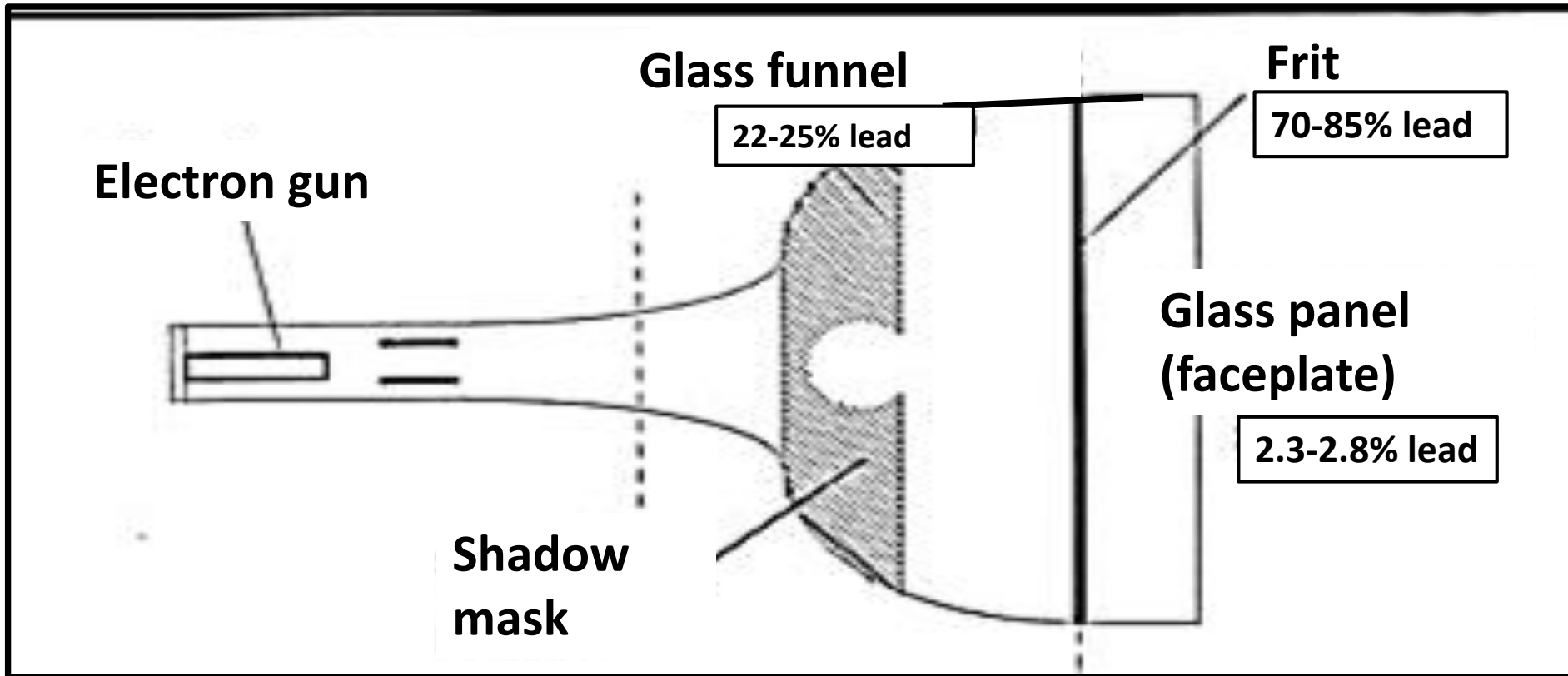
The Current CRT Landscape

METROPOLITAN WASHINGTON COUNCIL OF
GOVERNMENTS

MARCH 17, 2016

TRACY ATAGI, U.S. ENVIRONMENTAL PROTECTION
AGENCY

CRT Components



Cathode ray tubes typically contain about 4 pounds of lead, mostly located in the glass funnel and frit, and generally test as hazardous waste under U.S. regulations.

Picture courtesy of Massachusetts Department of Environmental Protection.

What is the Issue?

- CRTs and CRT glass were once easily recycled into new CRTs; however, the demand for new CRTs has collapsed in favor of new flat panel technologies.
- Because of rising costs, negative economic incentives, and shifts in CRT glass markets, some CRT processors and recyclers are choosing to store the glass indefinitely rather than send it for recycling (or disposal), which increases the risk of mismanagement and/or abandonment of the CRTs.
- TransparentPlanet's December 2012 report estimates that about 330,000 tons of CRTs are being stockpiled in the United States. Other sources estimate 3.2 to 6.6 million tons of CRTs have yet to be collected. One electronics recycler estimates that the cost to recycle CRTs will reach over two billion dollars in the next decade.

What is the issue?

- 2013 (PA, NY) – 12,000 tons of CRT glass abandoned.
- Aug 2013 (CO) –8,000 tons of CRT glass abandoned.
- Aug 2013 (AZ) – 3,000 tons of CRTs and CRT glass abandoned.
- Mar 2014 (OH) –1,500-3,000 tons of CRT glass abandoned. Recycler was both R2 and e-Stewards certified.
- Mar 2014 (AZ) – CRT recycler was fined \$120,000 for improper storage and recycling of CRTs.
- Mar 2014 (UT) – Fire occurred at CRT recycler, which may have been ignited from storing CRTs outside where reflection from the sun could ignite a blaze.
- Jul 2015 (MA) – Suspicious fire occurred at warehouse holding thousands of CRTs
- Oct 2015 (KY) – Recycler admitted to burying hundreds of wooden pallets and dozens of cardboard boxes filled with television monitors on their property.



U.S. Regulation of Cathode Ray Tube Recycling

- Under the 2006 CRT rule, CRTs sent for recycling are not regulated as hazardous waste as long as certain conditions are met, including requiring that the CRTs are:
 - 1) Properly labeled
 - 2) Stored and transported in an appropriate container
 - 3) Processed only in a building with roof, floor and walls
 - 4) Not subjected to temperatures high enough to volatilize lead from CRTs
 - 5) Have at least 75% of the volume recycled within the calendar year.
 - 6) Comply with export requirements [revised by 2014 CRT Export Rule].

U.S. Regulation of Exports of CRTs

- Under the 2014 CRT Export Rule, exporters of **used, intact CRTs exported for reuse** must notify EPA annually.
 - The notification must include information on the destination facility, quantities of CRTs exported, and information about transit countries.
- **Used CRTs (either intact or broken) exported for recycling** are subject to export notice and consent requirements.
 - In addition, beginning March 1, 2016, exporters must file an annual report summarizing the quantities (in kilograms), frequency of shipment, and ultimate destination(s) (i.e., the facility or facilities where the recycling occurs) of all used CRTs exported during the previous calendar year.

U.S. Regulation of Processed CRT Glass

- In addition, processed CRT funnel glass must be sent to a lead smelter or glass-to-glass manufacturer, or to a permissible final use.
- EPA has issued three letters providing further guidance on permissible final uses:
 - Use as a fluxing agent at copper smelters
 - Use of treated CRT glass as alternative daily cover in municipal landfills.
 - Use as a substitute for lead oxide in ceramic tile manufacturing.
- Processed CRT glass exported for CRT glass making or lead smelting or a permissible final use is not subject to the export requirements of the CRT exclusion. However, generators must be able to demonstrate that their CRT glass meets the terms of the exclusion.

EPA Letter on Copper Smelters

- Clarifies that CRT funnel glass sent to copper smelters would be excluded from hazardous waste regulation under the “use/reuse” exclusion (rather than the CRT rule).



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF
SOLID WASTE AND EMERGENCY
RESPONSE

APR 24 2013

Mr. Douglas Smith
Director, Corporate Environment, Safety and Health
Sony Electronics, Inc.
16530 Via Esprillo
San Diego, CA 92127

Dear Mr. Smith,

Thank you for your letter dated April 5, 2013, in which you request information regarding how funnel cullet from cathode ray tubes (CRTs) may be used as a fluxing agent in copper smelters under the current Resource Conservation and Recovery Act (RCRA) regulations. In short, although the CRT rule cannot be used to send CRT processed glass to copper smelters, it is possible to do so under 40 CFR 261.2(e)(1)(ii) if processed funnel cullet is used as an effective substitute for a commercial product. A complete explanation and more detailed responses to your two questions are below.

- 1. Based upon the similarities of copper and lead smelting, can the CRT rule be used to gain commodity classification for funnel cullet if consumed by copper smelting meeting genuine reuse of the leaded silicate presented here?**

No, the CRT rule cannot be used to send CRT processed glass to copper smelters.

Under 40 CFR 261.4(a)(2)(iv) of the RCRA regulations, processed CRT glass is excluded from solid and hazardous waste regulation, provided it meets the requirements of 40 CFR 261.39(c), that is, that the CRT glass is destined for recycling at a CRT glass manufacturer or a lead smelter and the glass is not speculatively accumulated as defined in 40 CFR 261.1(c)(8).

In the preamble to the 2002 CRT proposed rule, EPA solicited comment regarding whether to exclude from the definition of solid waste CRT glass sent to copper smelters and whether this glass is as commodity-like as glass sent to glass-to-glass recycling or lead smelters. (67 FR 40516, June 12, 2002)

In the preamble to the 2006 CRT final rule, we noted that commenters pointed out that glass is used as a flux agent at copper smelters in the same manner that it is used as a flux agent at lead smelters. Another commenter also said that virgin copper concentrate already contains approximately 1% lead and thus lead is a constituent already present in the copper smelting process and thus already managed in process residues. (71 FR 42937, July 28, 2006)

The Agency agreed with those commenters who pointed out that the degree of processing that is required for use in a copper smelter appeared to be the same as that required for use in a lead smelter and that the economics also may be similar for fluxes used in both kinds of

EPA Letter on Alternative Daily Cover (“ADC”)

- Explains how the hazardous waste regulations apply to CRT funnel glass sent for land disposal.
- Confirms that CRT funnel glass can be land disposed as long as the glass meets land disposal restriction requirements, which for lead is 0.75 mg/L, as determined using the TCLP.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

SEP 10 2014

OFFICE OF
SOLID WASTE AND
EMERGENCY RESPONSE

Mr. Douglas Smith
Sony Electronics, Inc.
16530 Via Esprillo
San Diego, CA 92127

Dear Mr. Smith:

Thank you for your letter dated March 26, 2014, in which you ask how the federal Resource Conservation and Recovery Act (RCRA) regulations would apply to glass from cathode ray tubes (CRTs) used as Alternative Daily Cover (ADC) at non-RCRA Subtitle C landfills.

In particular, I've considered your questions in terms of a situation where a person receives used CRTs from collection points and determines that these devices are intended for processing, treatment and use as ADC.¹ With this in mind, my responses to your questions are as follows.

Question 1: Is the act of grinding and stabilizing a D008 waste considered treatment and be required to operate under a RCRA Part B TSDF permit?

Under 40 CFR 260.10 of the RCRA regulations, “*treatment* means any method, technique, or process, including neutralization, designed to change the physical, chemical, or biological character or composition of any hazardous waste so as to neutralize such waste, or so as to recovery energy or material resources from the waste, or so as to render such waste non-hazardous, or less hazardous; safer to transport, store, or dispose of; or amenable for recovery, amenable for storage, or reduced in volume.”

Therefore, grinding and stabilizing a solid waste that exhibits the characteristic of toxicity for lead (D008) is considered treatment under RCRA because these acts are designed to change the physical and chemical character of the waste. In this particular case, it is the Environmental Protection Agency’s (EPA’s) understanding that the treatment/stabilization process is intended to render such waste non-hazardous and safer to dispose as ADC.

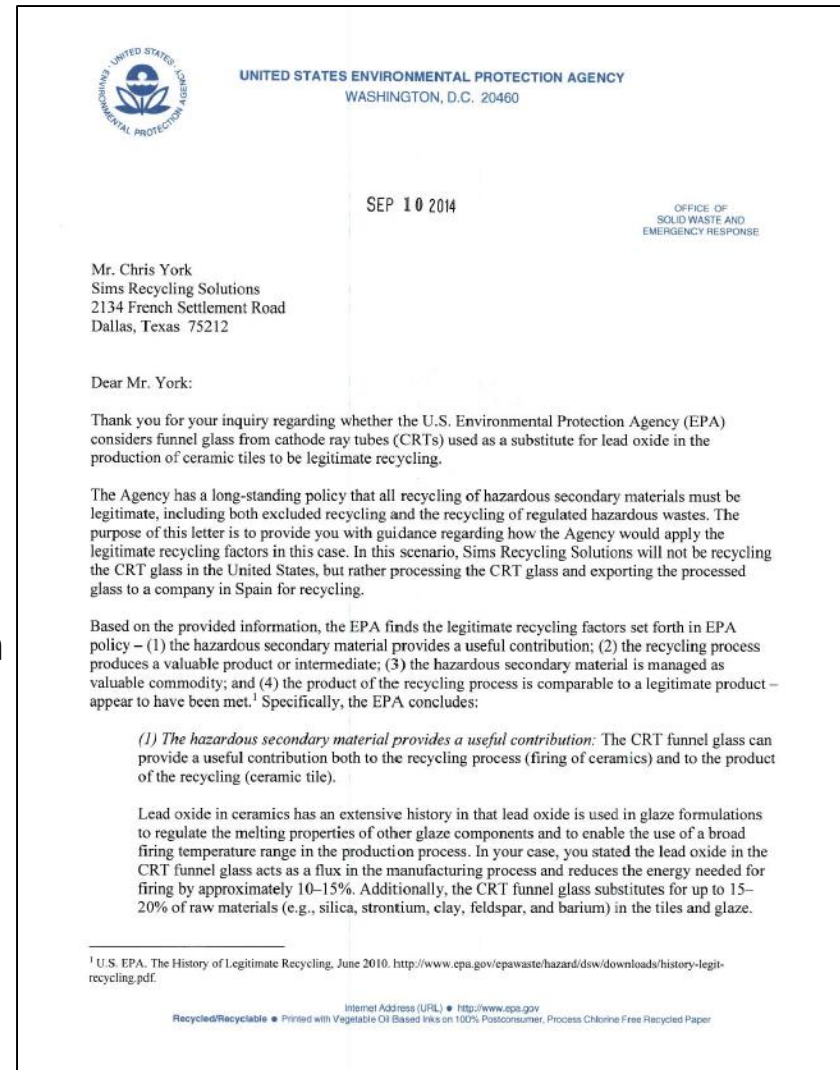
Treatment of hazardous waste generally requires a RCRA part B permit; however, a permit would not be required for treatment of CRT glass if such treatment is conducted by the generator of the hazardous CRT glass in compliance with applicable 40 CFR 262.34 hazardous waste generator requirements, as well as 40 CFR part 268 land disposal restrictions.² For example, a generator of

¹ For the purposes of this letter, the term “person” does not include entities discarding CRTs as “household hazardous wastes” under 40 CFR 261.4(b)(1) or businesses discarding CRTs that are considered “conditionally exempt small quantity generators” under 40 CFR 261.5.

² As a generator of hazardous waste, they would also be subject to the applicable generator regulations in 40 CFR part 262.

EPA Letter on CRT Glass Used as a Substitute for Lead Oxide in Manufacturing of Ceramic Tiles

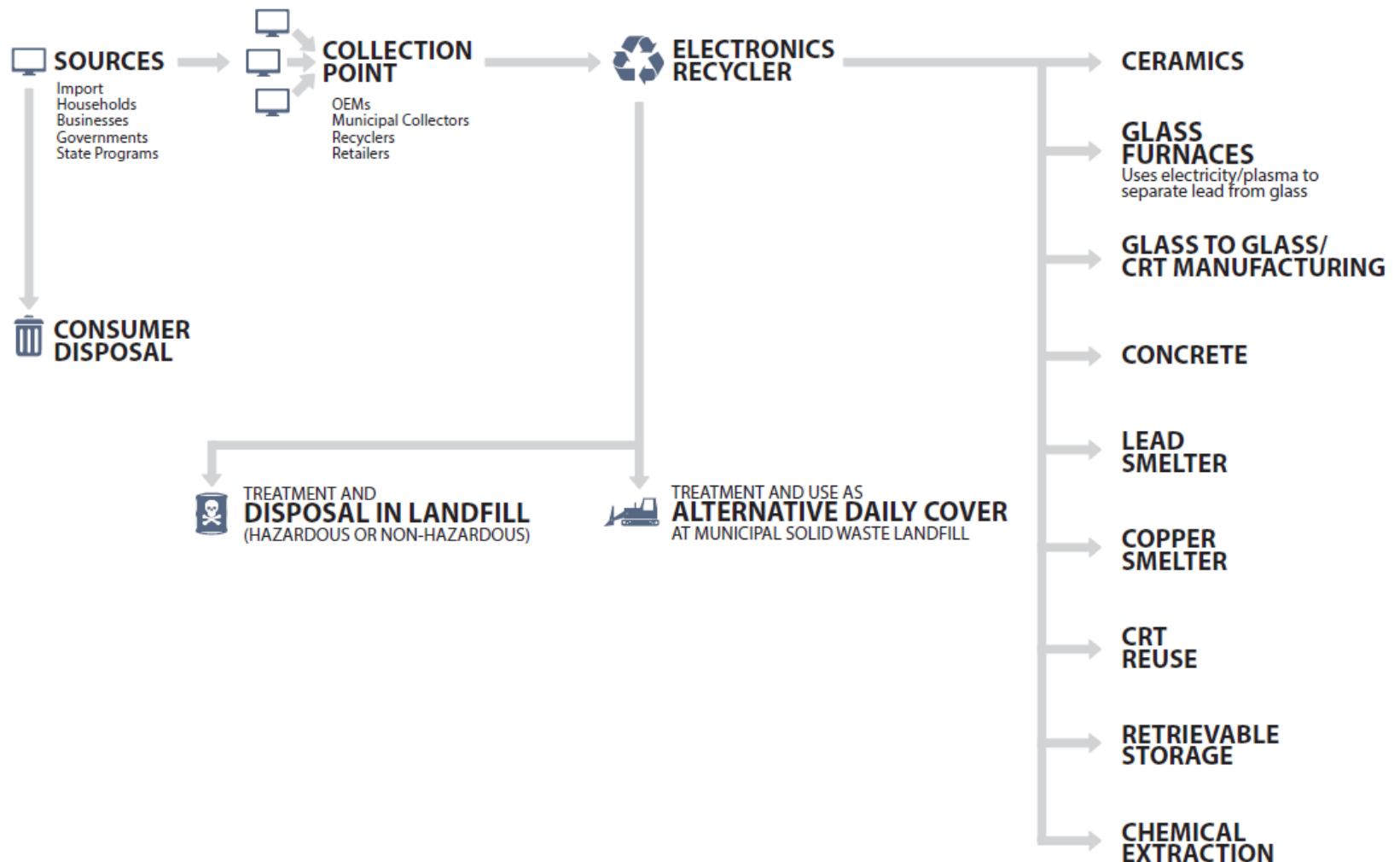
- Communicates EPA's determination that CRT glass used as a substitute for lead oxide in the manufacturing of ceramic tiles is legitimate.
- Provides EPA's rationale for this determination based on the four factors for legitimate recycling.





CURRENT UNDERSTANDING OF THE CRT LANDSCAPE

BY THE ELECTRONICS RECYCLING COMMUNITY
ASSEMBLED BY U.S. EPA, SEPTEMBER 2014



Conclusions and Next Steps

- EPA continues to support efforts to increase environmental sound recycling of CRTs, providing regulatory interpretations, monitoring the implementation of the new CRT export rule, and encouraging information sharing between all parties.
- Moving forward to address the problems of CRTs will require all parts of the electronics recycling community – including manufacturers, recyclers, NGOs, and governmental entities – to work together for solutions.