



Cathode Ray Tubes

Case Studies – Chris Cahnovsky, IEPA

CRTs in Open Dumps



- Definitions
- Why CRT are hazardous
- Two CRT scrapping case studies
- One CED Collector case study
- CRTs in an open dump

Cathode Ray Tube



- CRT – Means any vacuum tube or picture tube used to convert an electronic signal into a visual image, such as a TV or computer monitor.

CRT



Toxic Characteristic Leaching Procedure



- Designed to determine the mobility of both organic and inorganic analytes present in liquid, solid, and multiphasic wastes.
- Hazardous waste D004 through D052.
- The TCLP analysis simulates landfill conditions. Over time, water and other liquids percolate through landfills.

Covered Electronic Device



- CED – means any computer monitor or televisiontaken out of residence in this State.
- To the extent allowed under federal and State laws and regulations, a CED that is being collected, recycled, or processed for reuse is not considered to be hazardous waste, household waste, solid waste or special waste.

Why are CRT Hazardous



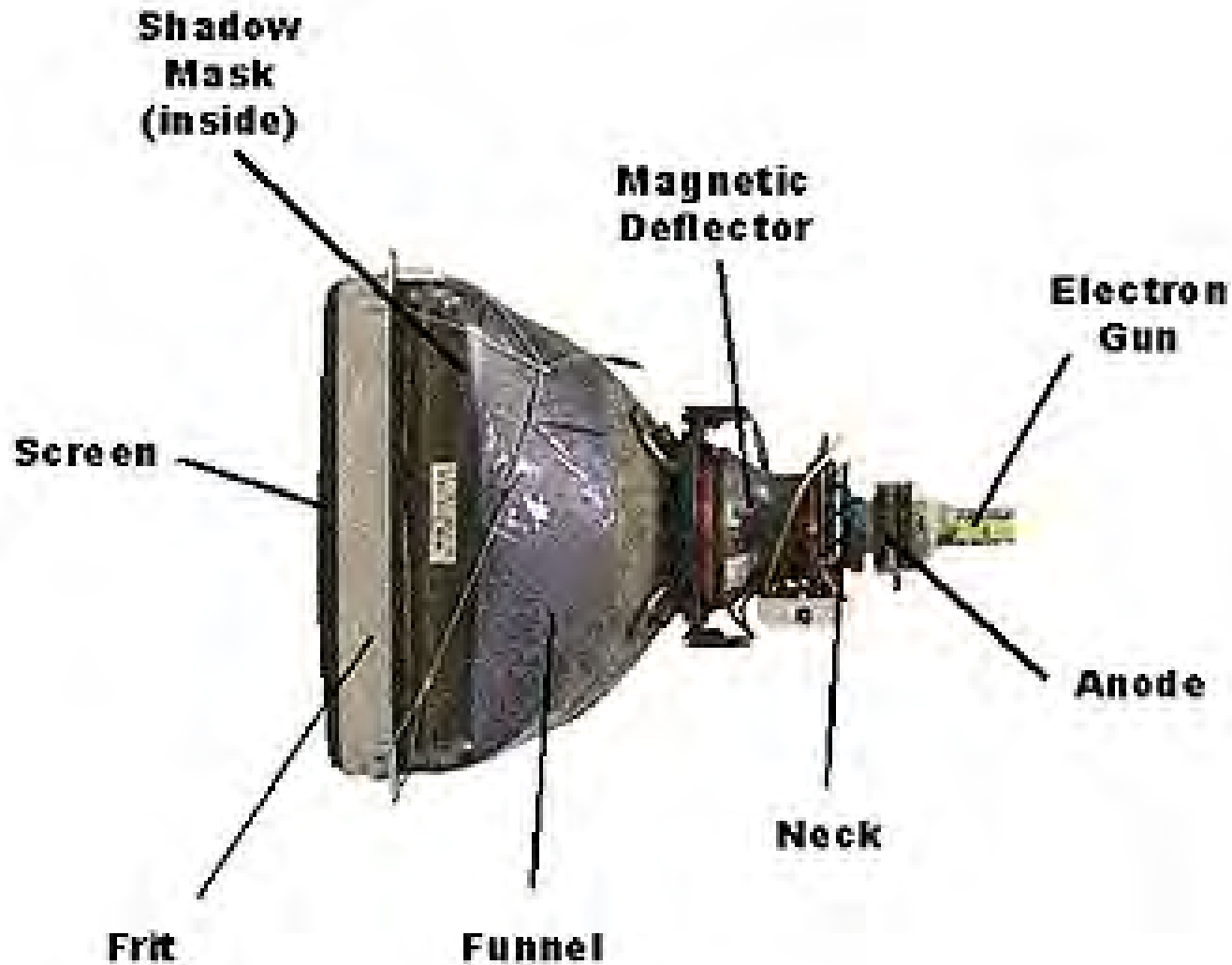
- Lead
- University of Florida conducted a study of the TCLP lead levels in CRTs
- Sampled 36 processed (ground) CRTs
- Average TCLP lead level was 18.5 mg/L
- Hazardous Waste TCLP lead level is 5.0 mg/L

Lead is CRT



- Factors that effect the lead levels in CRT
 - Location of the glass
 - Face Plate
 - Funnel
 - Neck
 - The partial size of the sample
 - Type of CRT – monochrome vs colored

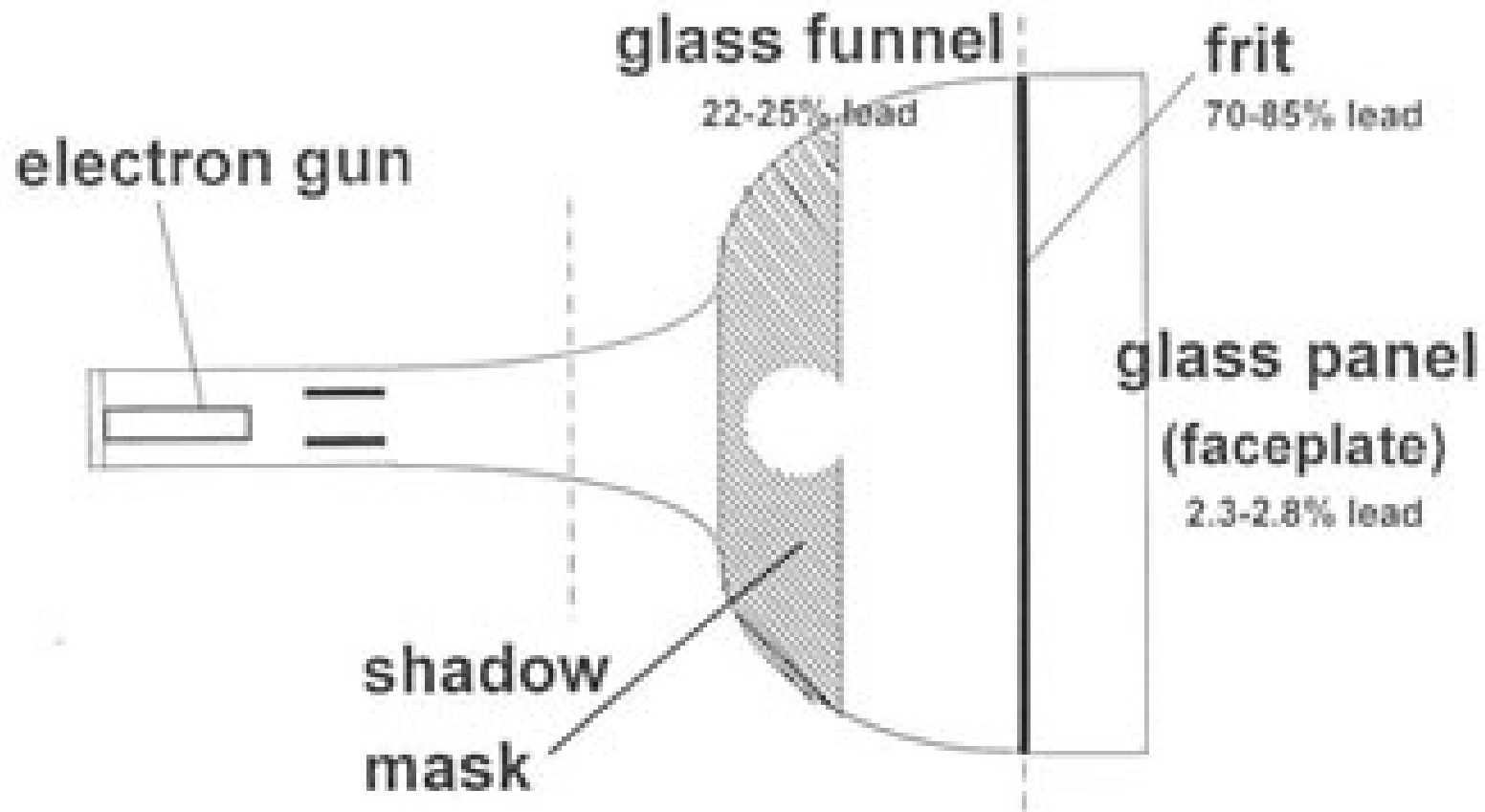
Lead in CRT



Lead in CRT



CRT Components



CRT



Lead in CRT



- Highest lead level is found in the funnel glass
- Average TCLP lead level was 75.3 mg/L
- The source is the Frit Seal in the funnel glass of color CRTs
- Monochrome CRTs passed TCLP

Monochrome CRT



Monochrome CRT



Lead in CRT



Lead Content in CRT Glass Components by Mass¹

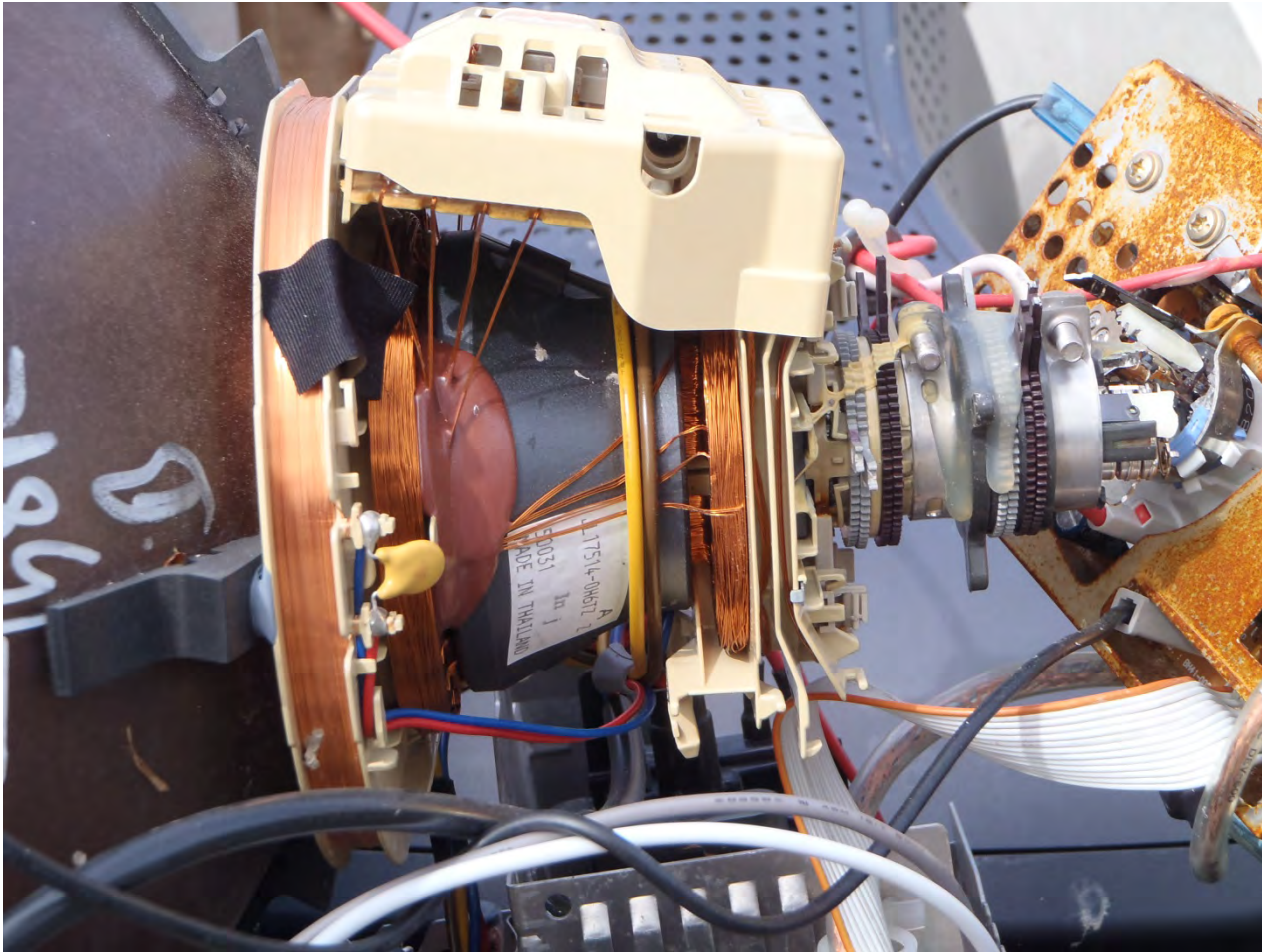
Glass	Color CRT	Monochrome CRT
Panel	0% - 3%	0% - 3%
Funnel	24%	4%
Neck	30%	30%
Frit	70%	N/A

1. S. Musson, Y.C. Jang and I.H. Chung. Characterization of Lead Leachability from Cathode Ray Tubes using the Toxic Characteristic Leaching Procedure, University of Florida – Florida Center for Solid and Hazardous Waste Management, December 1999

Case Studies



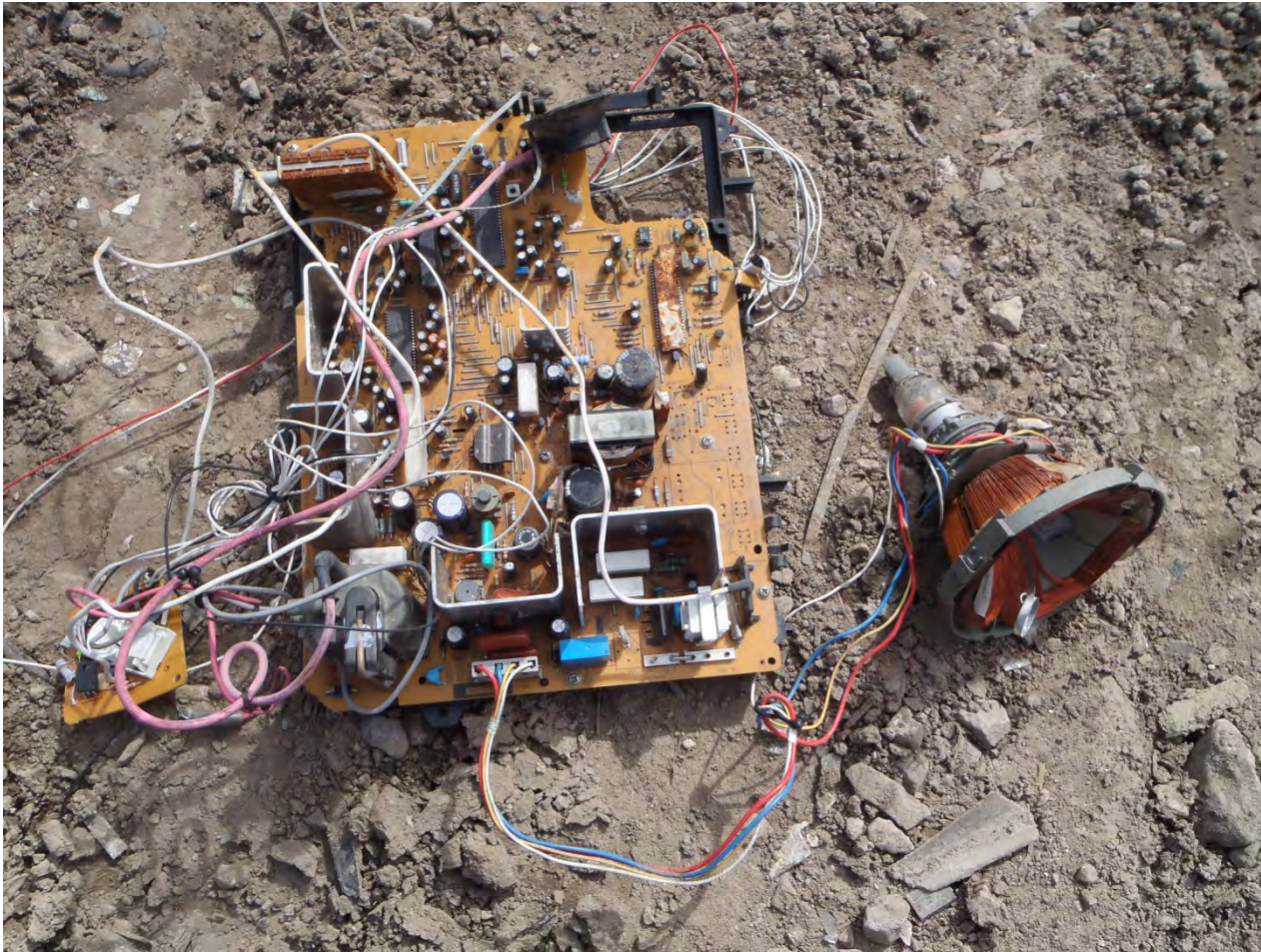
Case Studies



Case Study



Case Studies



East St. Louis/Towers



- Three guys breaking TVs to scrap copper parts and circuit boards
 - IEPA
 - East St. Louis Regulatory Affairs
 - East St. Louis Police Department
 - St. Clair County Sheriff's Department
 - St. Clair County State's Attorney
-
- Property Owner – OFS LTD (tax buyer)
 - Towers RP1
 - Brown RP2

East St. Louis/Towers



East St. Louis/Towers



East St. Louis/Towers



East St. Louis/Towers



East St. Louis/Towers



East St. Louis/Towers



East St. Louis/Towers



East St. Louis/Towers



East St. Louis/Towers



Interview



- Interview suspects – Towers
- From closed TV repair shop in Swansea, IL
- Rent-A-Center – would not say which one
- Later changed story
- Picked up off the street

Evidence Collection



- Collect Samples
 - Sampling and Analysis Plan
 - Site Safety Plan
 - Arrangement with lab
 - Selection of bottles
 - Selection of PPE
 - Sample Prep
 - Chain of Custody
 - Internal SOP

Sample



Prepared Sample



Lead Levels



- Total amount of lead in sample – 1,330 mg/Kg
- TCLP lead level – 297 mg/L
- Other constituents
 - Aluminum
 - Barium
 - Boron
 - Iron
 - Strontium
 - Zinc
 - Selenium
 - Antimony

Referred to St. Clair County State's Attorney



- Brown and Towers
 - Charged at the scene with Illegal Dumping – ESL Petty Offense - Dismissed
 - 2 counts of Criminal Disposal of Waste w/o a permit - Class 4 felony
 - Causing or allowing open dumping – Class A Misdemeanor
 - Causing or allowing open burning – Class A Misdemeanor

Referred to St. Clair County State's Attorney



- OFS LTD
 - Knew the TV operation was going on when purchased the property at a tax sale. May not have know extent of operation.
 - Causing or allowing open dumping – Class A Misdemeanor
 - Causing or allowing open burning – Class A Misdemeanor
- IEPA issued OFS, Towers and Brown VNLs

The Cleanup



- OFS LTD Cleaned up the site
 - 77 tons of garbage
 - 64 pounds of e-waste
 - 14.3 tons of CRT glass with some soil as lead hazardous waste (D008) to Michigan
 - 120 tons of non hazardous lead contaminated soil to Milam Landfill
 - About \$50,000

East St. Louis/Towers



Enforcement



- OFS LTD – Charges Dropped (Feb 2014)
- November 2013 Towers plead guilty to
 - Arrested by SCC Sheriff's Dept. (9/2013)
 - Causing or allowing open dumping – Class A Misdemeanor
 - Causing or allowing open burning – Class A Misdemeanor
 - 12 months probation
 - \$1,800.00

Enforcement



- Brown
 - Arrested SSC Sheriff's in November 2013
 - Plead guilty to the two misdemeanor charges
 - 12 months probation
 - \$1,500 fine
 - Got truck back

Centralia/Moll



- 24 year male collecting TVs and monitors from closed businesses and residence
- Scraping TVs and monitors of copper and circuit boards
- Open dumping and open burning
- 24 year diagnosed with sever Bipolar Disorder
- Dealt with parents

Centralia/Moll



Centralia/Moll



Centralia/Moll



Centralia/Moll



Centralia/Moll



Centralia/Moll



Centralia/Moll



Centralia/Moll



Centralia/Moll



- Took some TVs to Eagle Recycling
- Removed funnel glass
- Disposed of panel glass and shells in landfill
- Two 55-gallon drums of broken funnel and neck glass
- Picked up by Clean Harbors Environmental Services
- \$594.76 per drum

Collectors



- The Electronic Products Recycling and Reuse Act
- Collector
 - Register as a Collector with IEPA
 - Submit an annual report with IEPA

Collectors



- If they also take CRTs from businesses
- Title 35 Illinois Administrative Code 721.139:
Conditional Exclusion for Used, Broken CRTs and
Processed CRT Glass Undergoing Recycling
- CRTs are not solid wastes if they are destined for
recycling and the meet the following
requirements:

Collectors



- Storage
- Broken CRT must be managed in either of the following ways:
 - They are stored in a building with a roof, floor and walls or
 - Container (vehicle or package) that is constructed, filled and closed to minimize a release

Collectors



- Labeling
- Each container labeled
 - Used cathode ray tubes – containing leaded glass; or
 - Leaded glass from televisions or computers
 - AND
 - Do not mix with other glass material

Collectors




- No Speculative Accumulation
 - Recycle at least 75% in a calendar year
- No Use Constituting Disposal

Eagle Recycling – Shattuc, Illinois



- Registered Collector
- Per the 2014 annual report Eagle collected 16,602 pounds of CED
- Of that 2,300 pounds of Monitors and 3,975 TVs
- Collects from community sponsored electronic collections “one-day events”
- Not keeping residential CRTs from business CRTs
- Regulated by 35 IAC 721.139



Imagery Date: 9/28/2012  1998

38°39'09.57" N 89°12'44.45" W elev 479 ft

Eye alt 933 ft 

Eagle Recycling – Shattuc, Illinois



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- Violation Notice
 - Store CRTs inside or in a container
 - Label
 - And recycle
 - Recycle other CED – end speculative accumulation
 - Cease operating as a recycler
 - Cease open dumping and open burning
 - Waste to landfill
 - CCA

CRTs in Open Dumps



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Questions?



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