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.
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 television ...........taken 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

- Shadow Mask (inside)
- Magnetic Deflector
- Screen
- Frit
- Funnel
- Neck
- Electron Gun
- Anode
Lead in CRT

CRT Components

electron gun

glass funnel
22-25% lead

frit
70-85% lead

glass panel (faceplate)
2.3-2.8% lead

shadow mask
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 Mass

<table>
<thead>
<tr>
<th></th>
<th>Color CRT</th>
<th>Monochrome CRT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glass Panel</td>
<td>0% - 3%</td>
<td>0% - 3%</td>
</tr>
<tr>
<td>Funnel</td>
<td>24%</td>
<td>4%</td>
</tr>
<tr>
<td>Neck</td>
<td>30%</td>
<td>30%</td>
</tr>
<tr>
<td>Frit</td>
<td>70%</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Case Studies
Case Studies
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
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
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
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
• 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 severe Bipolar Disorder
• Dealt with parents
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
Eagle Recycling – Shattuc, Illinois
Eagle Recycling – Shattuc, Illinois
Eagle Recycling – Shattuc, Illinois
Eagle Recycling – Shattuc, Illinois
Eagle Recycling – Shattuc, Illinois
Eagle Recycling – Shattuc, Illinois
Eagle Recycling – Shattuc, Illinois
Eagle Recycling – Shattuc, Illinois
Eagle Recycling – Shattuc, Illinois
Eagle Recycling – Shattuc, Illinois
Eagle Recycling – Shattuc, Illinois

• 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
CRTs in Open Dumps
Questions?

- Chris Cahnovsky
- 2009 Mall Street
- Collinsville, Illinois 62234
- 618/346-5136
- chris.cahnovsky@illinois.gov