



STONE CASTLE RECYCLING REMOVAL ACTION

OSC Steven Merritt

www.epaosc.org/stonecastlerecyclingparowan



And now...
the rest of the story...



"THE REST OF THE STORY"

- Stone Castle Recycling
- RCRA – CRT Recycling Exemptions/Exclusions
- Request for Assistance and Initial Reconnaissance
- Access Negotiations
- Removal Site Evaluation
- Treatability Study
- On-Site Treatment and Removal Action
- Outcomes
- Takeaways

- Began Operations in Ogden, UT in late 1980s
- Moved to a Warehouse in Clearfield, UT in 2008 following a fire at their Ogden Facility
- Led glass raw materials market collapses in 2010
- Attempted Illegal Disposal in 2013
- Expanded Operations to Cedar City, UT in Summer 2013
- Expanded Operations to Parowan, UT in Fall 2013
- Expanded Operations in Clearfield, UT in Fall 2013
- Bad/Criminal Business Dealings in Expansions



FIRES

Ogden Facility – July 12, 2008



Cedar City Facility – July 8, 2014



Parowan Facility – March 2, 2014



Clearfield Facility – November 2, 2014





Clearfield - Warehouse



Cedar City - Warehouse



Clearfield - Lot



Parowan - Lot

RCRA – CATHODE RAY TUBE (CRT) RECYCLING EXEMPTIONS/EXCLUSIONS

40 CFR §261.4(a)(22)

- The following materials are not solid wastes for the purpose of this part:
 - Used, intact CRTs, unless disposed or accumulated
 - Used, intact CRTs when exported for recycling
 - Used, broken CRTs, meeting §261.39 conditions
 - CRT glass, meeting §261.39 conditions

40 CFR §261.39

- Used, broken CRTs are not solid wastes if they meet the following conditions:
 - Destined for recycling
 - Stored inside
 - Labeled properly
 - Not speculatively accumulated

HAZARDOUS DEBRIS AND LAND DISPOSAL RESTRICTIONS

40 CFR

§268.2(g) & (h)

- Debris:
 - Solid material intended for disposal
 - >60mm particle size
 - Manufactured objects...
- Hazardous debris:
 - Meets debris definition
 - Containing a hazardous waste listed in subpart D of part 261
 - Or exhibiting a characteristic of hazardous waste identified in subpart C of part 261

40 CFR

§268.45(b)(1) / Table 1

- Contaminants subject to treatment:
 - Toxicity characteristic debris
- Alternative Treatment Standards
 - Immobilization
 - Chemical Stabilization
 - Microencapsulation

REQUEST FOR ASSISTANCE

- EPA Region 8 RCRA Referral
- UT DEQ Request for EPA Removal Site Evaluation
- City of Parowan
- Residential Neighbors
- EPA Region 8 Upper Management Position:
 - Prolific Issue in Region 8
 - RCRA 7003 Orders?
 - Limited Regional CERCLA Budget
 - Wait?

- OSC Position:

QUIT MAKING EXCUSES, PUTTING IT OFF, COMPLAINING ABOUT IT, DREAMING ABOUT IT, WHINING ABOUT IT, CRYING ABOUT IT, BELIEVING YOU CAN'T, WORRYING IF YOU CAN, WAITING UNTIL YOU'RE OLDER, SKINNIER, RICHER, BRAVER, OR ALL AROUND BETTER. SUCK IT UP, HOLD ON TIGHT, SAY A PRAYER, MAKE A PLAN &

JUST DO IT.



PAROWAN FACILITY - INITIAL RECONNAISSANCE



- Conducted with DEQ on August 13, 2014
- 330 CY – Burned Debris
- 830 CY – Mixed Hazardous Debris
- 640 CY – Intact CRTs
- Deterioration and Contaminant Migration
- A MESS!

ACCESS NEGOTIATIONS

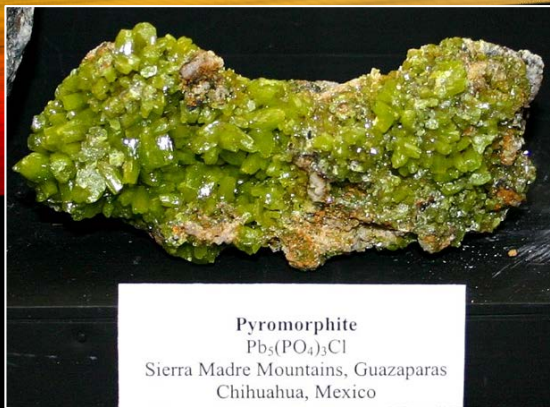
- Property owner reluctant with EPA involvement
- Concerned about CERCLA liability and cost-recovery
- Innocent landowner defense?
- City of Parowan and inaction by RP most persuasive
- Access granted on October 1, 2014
- The Speed of Trust!





REMOVAL SITE EVALUATION

- Sampling Efforts:
 - Soil Metals
 - Soil Dioxin
- Data Collection:
 - CRT Disassembly
 - Weight Fractions
 - Volume/Areal Extent
- Treatability Study:
 - Available Reagents
 - Composite Samples
 - CRT Glass



TREATABILITY STUDY

- Toxicity characteristic for lead = hazardous waste
- Limit is 5 mg/L Pb in leachate
- CRT glass matrix
- Used locally-available treatment reagents
 - Monoammonium phosphate fertilizer (MAP)
 - Portland cement (PC)
- Adapted in-situ soil remediation approach
- Goal = Pyromorphite
- Neither reagent “worked” independently...

Waste Matrix & Treatment	TCLP Pb Concentration	% Reduction in Pb Leachability
CRT Glass— No Treatment	16.8 mg/L Exceeds Limit	N/A
CRT Glass— 3% MAP Only	8.5 mg/L Exceeds Limit	49.4%
CRT Glass— 3% PC Only	6.4 mg/L Exceeds Limit	61.9%
CRT Glass— 3% MAP & PC	0.10 mg/L Below Limit	99.4%

TREATMENT OVERVIEW

- 7 Steps:
 - Segregation
 - Packaging
 - Scrap Metal
 - Electronic Waste
 - 1st Pass Grinding
 - Add MAP to Stockpile
 - 2nd Pass Grinding/Mixing
 - Pug Mill PC Addition
 - Package and Sample
 - Landfill



TREATMENT – PARTICLE SIZE REDUCTION



TREATMENT – CHEMICAL STABILIZATION



- Addition of bulk MAP to 1st pass stockpiles
- Re-grinding waste stockpile to mix/crush MAP into waste
- Constant addition of H₂O to minimize dust and help reaction
- Stockpiling 2nd pass treated waste
- Enjoy the pungent odor of ammonia and know it is working!

TREATMENT - MICROENCAPSULATION

Ideal
Method (\$\$\$)



Acceptable
Method (\$)



TRANSPORTATION AND DISPOSAL

- 20-CY Roll-Off Boxes
- Lined with Plastic!
- Portland cement catalyzes the reaction
- ECDC Subtitle D Landfill in Carbon County, Utah was a 4-Hour Haul
- 40 Truckloads of Treated Waste to Landfill



OUTCOMES

- Final Volumes:
 - 680 Tons of Treated Electronic Waste
 - 120 Tons of Excavated and Treated Soils
 - 20 Tons of Debris
 - 10 Tons of Scrap Metal
- Final Cost:
 - \$450,000
 - 30-50% Less Than Alternatives
- On-Site Treatment Method Developed
 - Non-Detect for TCLP Metals in the Field
 - Cost Savings \$200,000
- Additional Cost Saving Efficiencies Realized
- UT DEQ Incorporating Approach with Other Stone Castle Sites
- Other Electronic Waste Sites in Region 8

TAKEAWAYS

- Heavy-Duty Horizontal Grinder Screens
- Eliminate Pug Mill and Mix Portland Cement in with Heavy Equipment
- More CERCLA Approved Landfills Needed



QUESTIONS

Steven B. Merritt, CIH
Industrial Hygienist / OSC
U.S. EPA Region 8
1595 Wynkoop ST (8EPR-ER)
Denver, CO 80202-1129
303-312-6146 - Work
303-775-7226 - Mobile
303-312-7203 - Fax
Merritt.Steven@epa.gov

