

# Fluorescent Lamp Drumtop Crushers-Policy and Practice

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## Overview

- What is a Drumtop Crusher, or DTC, and why are they used?
- DTC studies and findings
  - What are the concerns?
- State Policies, Federal Universal Waste Rule
  - Treatment, CESQGs, other issues
- Conclusions

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## Why use DTCs?



- Most (some?) people love to break stuff - 'it blew up real good'
- Perceived simplicity and cost savings compared to handling intact tubes
- Volume reduction
- Mercury Control?

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Locked up in a cage; "To Make Tubes Fit B--ket"



Fall view of a Minnesota wetland  
What's a wetland without a pile of crushed lamps?



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Hennepin County, 1/2007  
Abandoned at an HHW facility



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## Global leadership counts What example do we set for others?



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## History in MN

- 3M tested crushers and measured releases – published a lighting/IH journal article in early 1990s noting mercury releases and exposure concerns; 3M did not use crushers
- MN driven to develop lamp management guidelines in 1992, based on UWR draft
- Based on concerns in article, MPCA decided
  - that crushing was HW treatment under RCRA
  - that crushing was not eligible for 'generator treatment in a drum' due to mercury releases
  - that it did not want to regulate lamp generators

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## History – EPA studies

- EPA investigated lamp crushers in two studies in the early 1990s:
  - Management of Used Fluorescent Lamps: Preliminary Risk Assessment (1993)
  - Evaluation of Mercury Emissions from Fluorescent Lamp Crushing (1994)
- Both studies concluded that crushers had significant emissions

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## UWR on lamp treatment/crushing

- UWR Lamp Proposal, 1994
  - “The proposed universal waste management system includes a prohibition on treatment (crushing is considered treatment) of lamps at the generator, transporter and consolidation points.” (59 FR 38297; Preamble IV.B.2.)
- Final UWR for lamps, 1999
  - Prohibition on Treatment (64 FR 36477; V.B.1.)  
“The crushing of spent mercury-containing lamps clearly falls within this definition [of treatment].”

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## CESQGs and UW

- “Therefore, in the final rule, the Agency has retained the opportunity for CESQGS to manage their wastes under either the CESQG exemption [discard] or under part 273 [UWR].” (60 FR 25510)
- Any business, including CESQGs, can be a UW generator and choose to be a UW handler
- UW handlers cannot crush lamps-it’s treatment
- Even HW LQG’s cannot crush lamps without a full HW treatment permit (next slide)

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## Minnesota ‘demonstration’ Feb. 2002

- DTC manufacturer contacted MPCA regarding state ban, we suggested a ‘demonstration’
- MPCA learned of DTC in use without permits, at LQG
- Demonstration with MPCA, MDH, county, facility, manufacturer reps present
- Lumex used to measure mercury levels at exhaust vent, breathing zone, ambient room
- Significant levels measured
  - breathing zone while crushing: > MN OSHA 8 hr limit of 25 mcg/m<sup>3</sup> for workers
  - ambient: > MDH acute 1 hr limit of 1800 ng/m<sup>3</sup> for general public

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## MDH-ATSDR Health Consultation

- DTC 'demonstration' in MN resulted in publication of Health Consultation in December 2003
- 'Drum-Top Bulb Crusher Demonstration at the Minneapolis-St. Paul International Airport'
  - "The use of drum-top bulb crushers can clearly expose people, including the general public, to hazardous mercury vapor concentrations."
  - "EPA should conduct a broad investigation of emissions from mercury-containing bulbs, and determine national regulations and policies that can reduce overall mercury emissions from bulbs and decrease potential exposures of individuals who may be incidentally or occupationally exposed to mercury from recycling operations."

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## EPA Regions and crushing

- March 2003: An EPA Region proposes 'noncontroversial immediate final rule' 30 day notice approval of a state UWR that allows lamp crushing (68 FR 12015)
- State program controlling lamp crusher emissions at federal OSHA levels (50 mcg/m<sup>3</sup>) declared equivalent to federal prohibition on crushing (68 FR 11985)
- Immediate final rule withdrawn due to comments opposing authorization (68 FR 23407)

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## EPA HQ policy and study

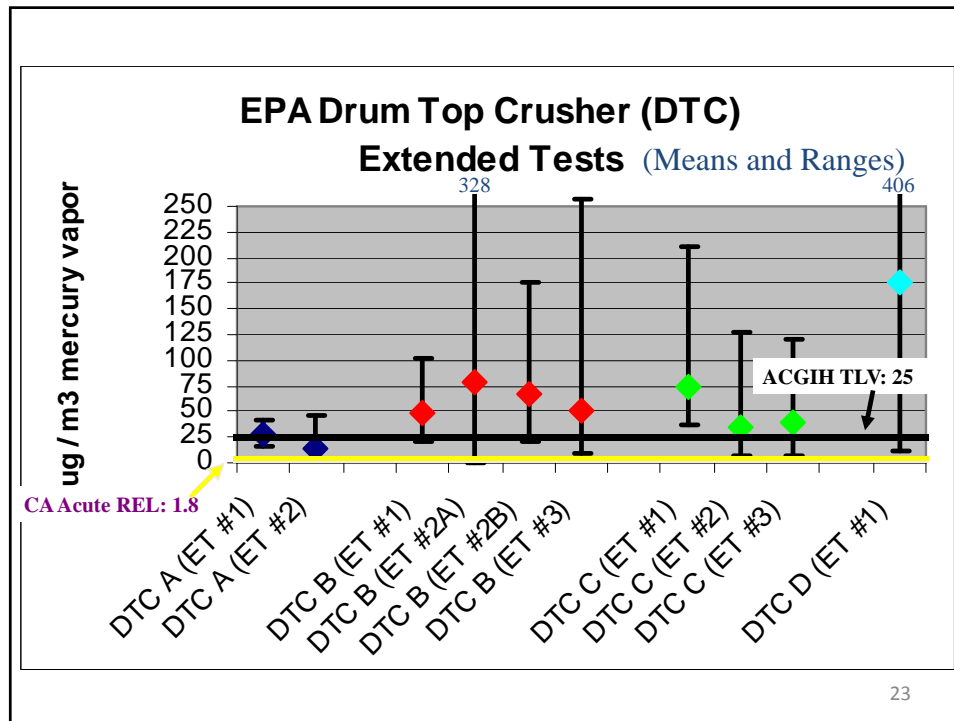
- 2003 EPA Regional Authorization incident spurred EPA HQ to begin developing national policy addressing lamp crushing
- EPA HQ assumes responsibility for Drumtop Crusher Study initiated at Regional level; states not involved

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## EPA DTC Study 2003-2006

- June 2005: Draft study to peer reviewers
- August 2006: Final Study released and posted on EPA website
- Peer Reviewer comments in Appendix J; however many factual statements and conclusions in final report are significantly changed from peer review draft
- Website appeared to tout use/benefits while minimizing health/environment concerns

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## What's so bad about these results?

- 'Fundamental DTC design objective is containing mercury' (or volume reduction?)
- New machines
- Manufacturers' representatives present during setup and testing
- Operated by trained personnel with PPE
- None of the problems would have been identified in absence of monitoring equipment

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## DTC Technical Workshop March 2007

- USEPA convenes stakeholders to:
  - discuss technical issues raised in DTC study
  - identify issues for safe DTC use
  - discuss possible BMPs for DTC use
- USEPA proposes developing DTC BMPs and convenes stakeholder group of states to develop

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## BMPs for lamps

- State Response: Develop broader set of Lamp Management Guidelines and BMPs to educate all UW generators in all aspects of lamp management; DTCs and risks in larger context
- ASTHO State Environmental Health Directors comment on public health risks associated with lamp management and specifically DTCs
- EPA releases guidelines addressing technical issues in September 2009

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## Another study raises concerns

- **“Assessing Occupational Mercury Exposures During the On-site Processing of Spent Fluorescent Lamps”**
  - Alan Lucas and Robert Emery, Univ. of Texas
  - March 2006 Journal of Env. Health, pp. 30-34
- OSHA exposure levels exceeded even with low mercury lamps
- Several processing and operational steps contribute to possible elevated exposures
- NO cost savings at end of day vs. mgmt of whole lamps (personal communication w/authors)

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## Drum-top Crusher (DTC) Issues

- |                                    |  |
|------------------------------------|--|
| • Exposures to operator and public | • High, unknown w/o monitoring           |
| • Environment                      | • Significant releases                   |
| • Maintenance                      | • Difficult, easy to fudge               |
| • Cost                             | • No advantage, likely to be more costly |
| • UWR Legality                     | • Not legal under UWR                    |
| • HW Legality                      | • Requires Treatment permit under RCRA C |

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## Conclusions

- DTCs have significant releases, affecting
  - Occupationally exposed employees, General public, Environment, Site contamination
- DTC operation, monitoring, oversight concerns
- Not a money saver when all activities counted
- DTCs are hazardous waste treatment and not allowed for UW handlers, HW generators

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## Acknowledgments

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- NEWMOA Lamp Recycling Workgroup
- Other concerned states, including but not limited to: CA, FL, IL, MO
- ALMR: Key regulatory questions and concerns

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## “State Equivalency” 64 FR 36478

- “Therefore, EPA will consider authorization of state programs that include provisions for controlling treatment or crushing of universal waste lamps, where the state program application includes a demonstration of equivalency to the federal prohibition. Factors the Agency would expect such an application to address include the effectiveness of technical requirements in controlling emissions of hazardous constituents, the level of interaction of regulated entities with the regulatory agency to ensure compliance with control requirements, and other factors demonstrating that the state regulatory program would be equivalent to the federal treatment prohibition.”
- ALMR’s Key regulatory question:
  - “What is state ‘equivalency’ to the federal prohibition on crushing as treatment?”

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## UWR definitions

- UWR defines generators and handlers in 40 CFR 273.6 and establishes prohibitions in 273.11 and 273.31 (60 FR 25497-25501, 25544-25548)
- “*Generator means any person, by site, whose act or process produces hazardous waste identified or listed in part 261 of this chapter or whose act first causes a hazardous waste to become subject to regulation.*”
- “*Universal Waste Handler:*
  - (a) Means:
    - (1) A generator (as defined in this section) of universal waste;
  - (b) Does not mean:
    - (1) A person who treats (except under the provisions of 40 CFR 273.13 (a) or (c), or 273.33 (a) or (c)), disposes of, or recycles universal waste;”

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## CESQGs as UW Handlers

- Any business, including CESQGs, can be a UW generator and choose to be a UW handler; HW generator size category does not define UW generator or UW handler status
- 'CESQG' can choose to discard, be a UW handler and manage lamps as UW, or obtain EPA Generator ID number and manage as HW
- If a CESQG chooses to manage lamps as UW, all UWR provisions apply; the CESQG becomes a UW handler and cannot discard, treat, or recycle UW

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## Early article influencing MN policy

- Tanner, Linda J. *Managing Fluorescent Lamp Waste at 3M*. Lighting Management and Maintenance. October 1992.

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