Progress Update: Permit Integrity Team

Waste Analysis Plans and Land Disposal Restriction Compliance

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Big Picture

- LDR Failures: 10 of 14 (71%) TSDF inspection sample sets had LDR failure rates ranging from 2.6% to 84%.
- Review of RCRA TSDF's WAPs shows: 1) lack of detail and justification; and 2) the need for continued attention to this core element of the base program.
- First comprehensive review of LDR WAP provisions since 1986.
- Infrequent, inadequate or ineffective monitoring of a facility's LDR compliance could result in land disposal of significant volumes of waste that do not meet LDRs.

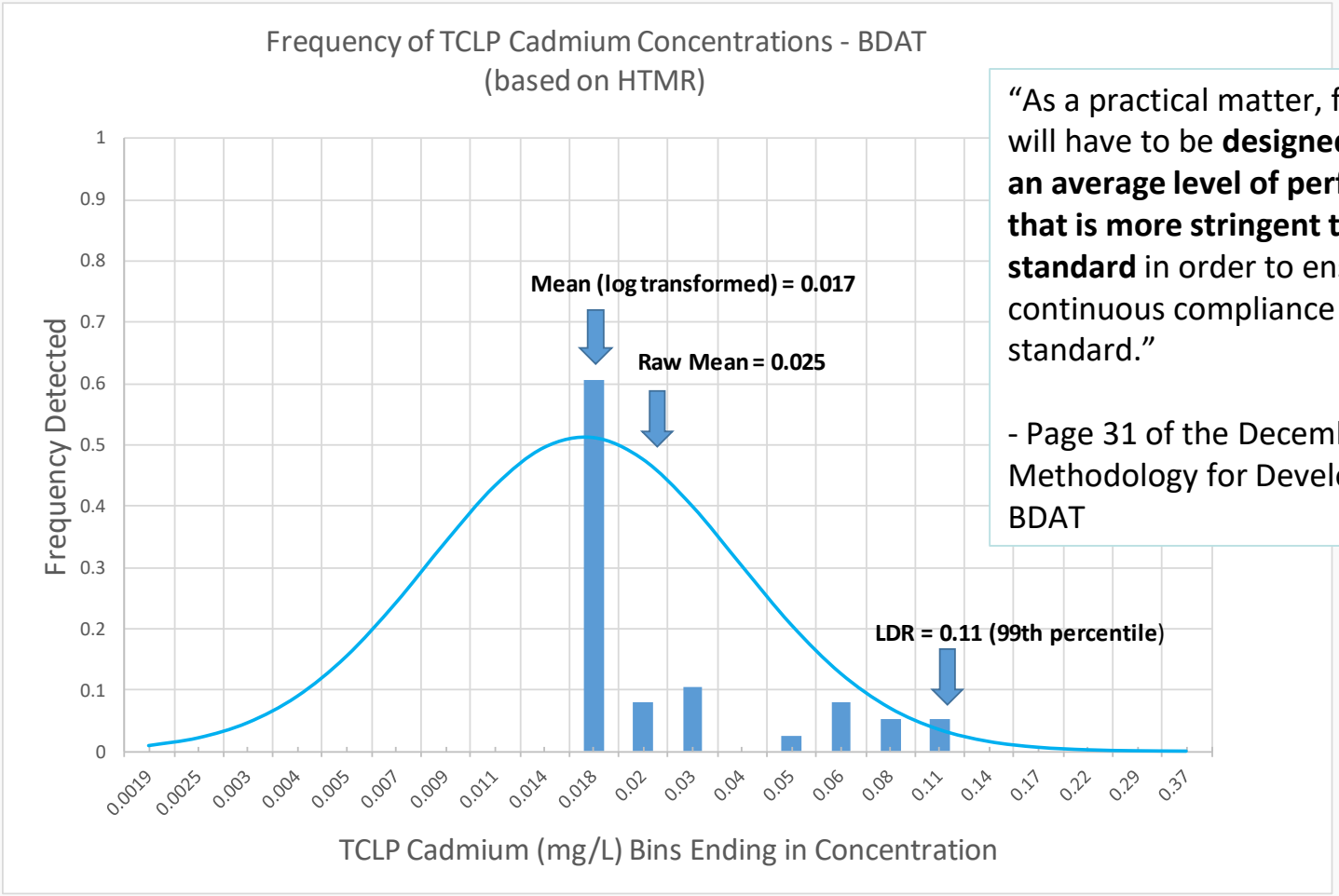
Overview of LDR Program

The purpose of the LDR program is to minimize short and long-term threats to human health and the environment by reducing the toxicity or mobility of hazardous constituents before they are land disposed by:

- Prohibiting hazardous wastes from land disposal unless meeting established treatment standards.
- Specifying treatment standards by concentration or a treatment method.
- Attaching LDR at the point of generation, not the point of disposal.

Generally, *listed wastes* meeting LDRs must be disposed in a Subtitle C landfill while *characteristic wastes* meeting LDRs can be disposed in a non-hazardous waste landfill.

How were LDR Standards Set?



"As a practical matter, facilities will have to be **designed to meet an average level of performance that is more stringent than the standard** in order to ensure continuous compliance with the standard."

- Page 31 of the December 1988 Methodology for Developing BDAT

WAPs and LDRs

- The WAP provides the basis for monitoring how a facility meets the requirements of the LDR program.
- The WAP regulations (40 CFR 264/5.13) state that before an owner or operator treats, stores, or disposes of any hazardous wastes, a detailed chemical and physical analysis of a representative sample of the waste must be obtained and at a minimum, the analysis must contain all the information which must be known to treat, store or dispose of the waste.
- The LDR regulations (40 CFR 268.7) state (in part) that facilities that treat and/or land dispose must test the wastes or treatment residues according to the frequency specified in their WAP to assure they are meeting the LDR standards.
- EPA guidance emphasizes that testing for LDR compliance must be detailed in the WAP to the satisfaction of the Permit Writer on a case-by-case basis.
- Treatment and disposal facilities must conduct periodic detailed physical and chemical waste analysis to assure that LDRs are met on a justified and specified frequency. Guidance states frequency be at least annually.

Well-Designed Treatment and Sampling

Well-Designed Treatment System

- LDR treatment standards were established to be achievable 99% of the time and no portion of the waste exceeding the standard (i.e. any grab sample must pass).
- A Well-Designed and Well-Operated stabilization process includes: waste segregation, size reduction, homogenous mixture, proper mixing, reagents, waste-to-reagent ratios, treatment inhibitors/interferences, and cure time.
- Post-Treatment Testing frequency should consider the design and operation of the treatment process.

Type of Post-Treatment Sampling

- 40 CFR 268.40 and 268.48 state that compliance is measured by an analysis of grab samples.
- Grab sampling ensures conformity with LDR program goals.
- While enforcement can be based on a single grab sample, a variable wastestream or one with concentrations close to the standard may need more comprehensive sampling (such as multiple grabs) to ensure compliance on a day to basis as part of the permit.
- WAPs may authorize a different sampling strategy if statistical equivalence to grab sampling is demonstrated.
- A facility can be in compliance with WAP but not LDRs.

WAP LDR Team Background

- In 2018, the RCRA Permit Integrity Team (PIT) identified as a priority issue the review and possible improvement of Waste Analysis Plans (WAPs) in ensuring LDR treatment compliance.

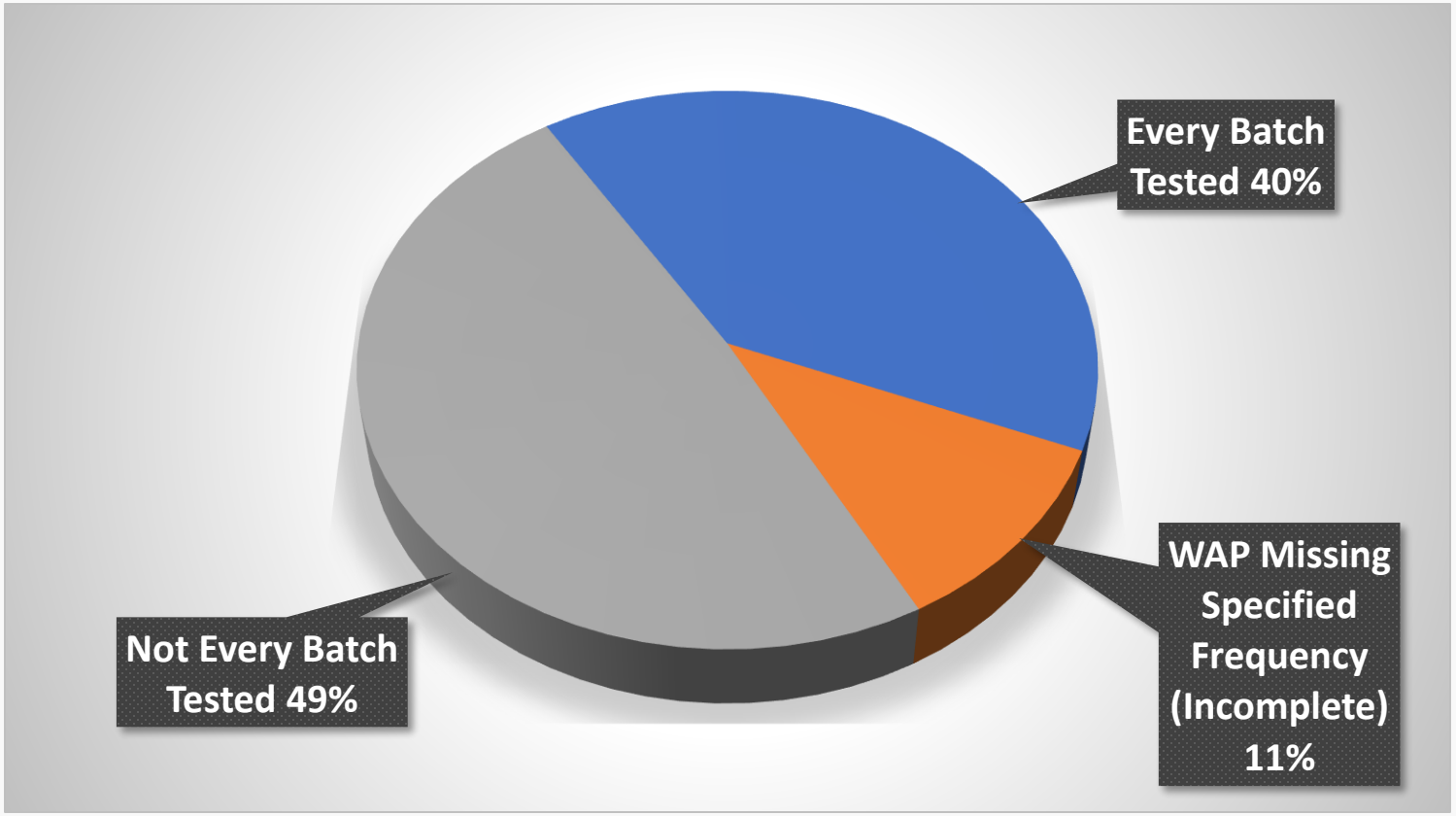
- As a result, the WAP-LDR Team was formed with representatives from ORCR, OECA-HQ, NEIC, EPA Regional Offices and State Agencies.

- The Team collected WAPs from 57 TSDFs that either stabilize or dispose of metal-bearing hazardous waste. The Team also reviewed numerous LDR Federal Registers and guidance documents on WAPs and LDR compliance.

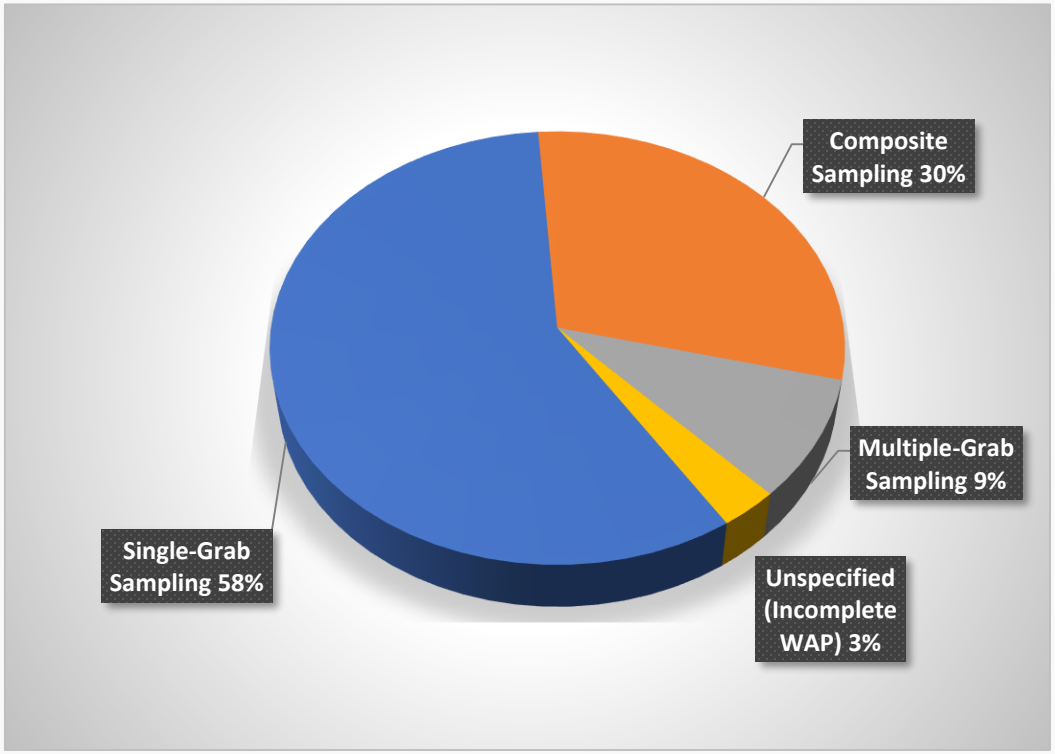
Team Findings - Elements of Well-Designed and Operated Treatment System

- Only 44% identified the treatment reagents used.
- Only 35% reported how waste was stored after treatment.
- Only 21% reported the mixing method, mixing time or achieving homogeneity.

Team Findings – TSDF WAP Testing Frequency



Team Findings – TSDF WAP Sampling Types

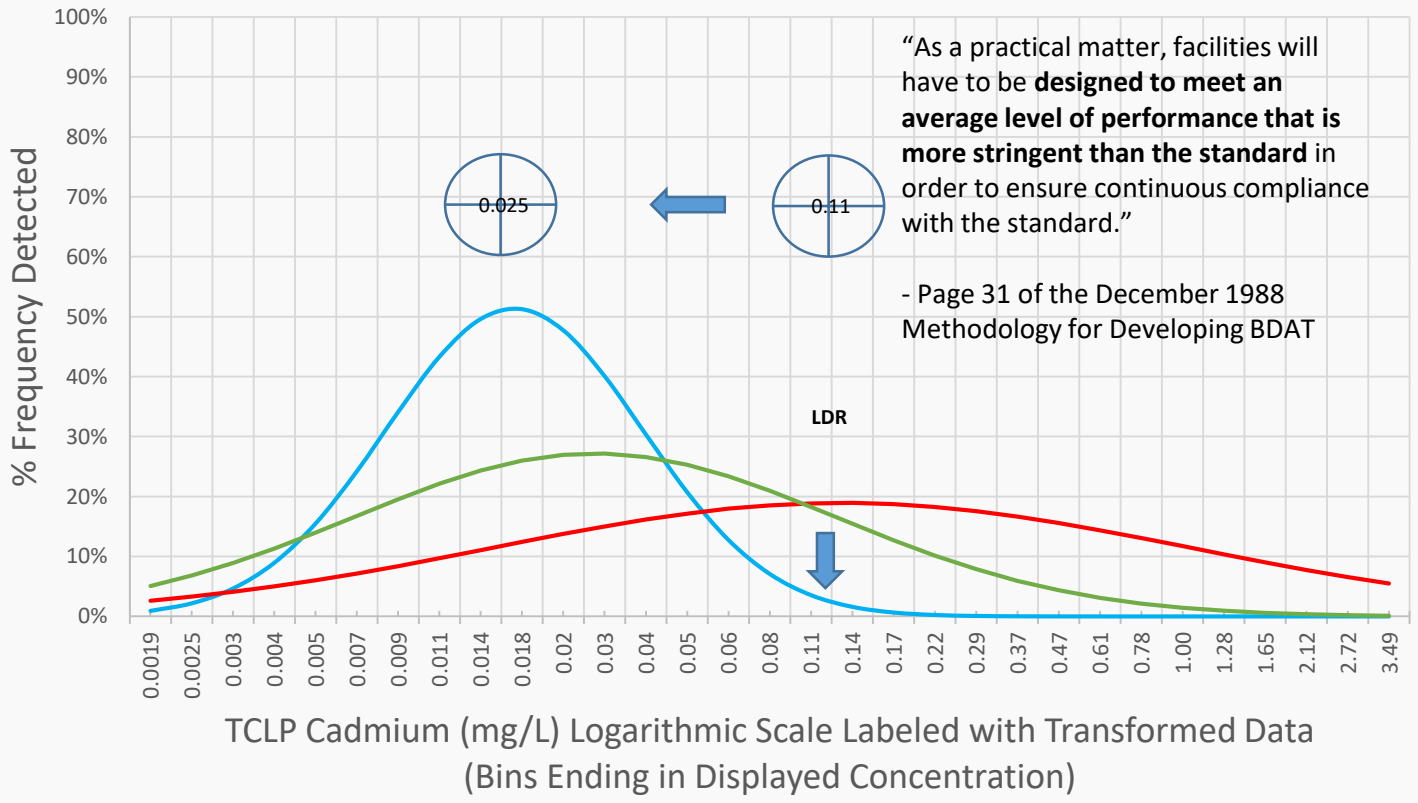


79% Have Biased Sampling.
21% Have Random Sampling.

WAPs and LDR Compliance

- LDR Failures: 10 of 14 (71%) of TSDF inspection sample sets had LDR failure rates ranging from 2.6% to 84% of treated batches.
- 88% Facility Failure Rate when WAPs do not require sampling every batch.
- 50% Facility Failure Rate when WAPs require sampling every batch.

Aiming at the BDAT Instead of at the LDR Standard



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Next Steps

- Continue further study of data and seek additional information, including potentially more sampling and analysis.

- Share review with WAP-LDR team members and present analysis to the ASTSWMO, States, regulated community, others for their input.

- Consider developing tools to improve WAPs to ensure LDR compliance that can be used across the country.
  - Collaboration of diverse expertise
  - Promotes a level playing field

- Examples of possible tools:
  - Spreadsheet of WAP required elements by waste code
  - Statistical Guidance on LDR sampling
  - WAP Checklists
  - Others?

Example Compliance Tool

LDR Phase IV BDAT Descriptions, Mean Treatment Concentrations, and LDR Universal Treatment Standards

Constituent	Mean of BDAT Treatment (mg/L TCLP)	Variability Factor of BDAT Treatment	UTS (mg/L TCLP)	Number of Observations	Technology	Document Number in LDR Phase IV Rule Docket (regulations.gov)
Antimony	0.21	5.60	1.15	50	Stabilization	EPA-HQ-RCRA-1998-0003-0115
Arsenic			5.0			
Barium	2.6	8.04	21.0	12	Stabilization	March 10, 1997 Memorandum
Beryllium	0.19	6.47	1.22	7	Stabilization	EPA-HQ-RCRA-1998-0003-0108
Cadmium	0.025	4.32	0.11	38	HTMR	EPA-HQ-RCRA-1998-0003-0107
Chromium	0.10	6.02	0.60	38	HTMR	EPA-HQ-RCRA-1998-0003-0107
Lead	0.12	6.28	0.75	27	Stabilization	March 10, 1997 Memorandum
Mercury	0.0043	5.47	0.025		Acid Leaching	EPA-HQ-RCRA-1998-0003-0151
Nickel	2.9	3.72	11.0	117	HTMR	EPA-HQ-RCRA-1998-0003-0107
Selenium			5.7			
Silver	0.032	4.32	0.14	111	HTMR	EPA-HQ-RCRA-1998-0003-0107
Thallium	0.092	2.19	0.20	15	Stabilization	March 10, 1997 Memorandum
Vanadium	0.57	2.8	1.6	1	Stabilization	March 10, 1997 Memorandum
Zinc	0.35	12.2	4.3	6	Stabilization	March 10, 1997 Memorandum

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