

US EPA ARCHIVE DOCUMENT

December 5, 1997

MEMORANDUM

TO: Nick Vizzone, EPA

THROUGH: Mary Wolfe, SAIC

CC: Anita Cummings and Elaine Eby, EPA

FROM: Howard Finkel, ICF

SUBJECT: Calculation of Universal Treatment Standard (UTS) for Stabilized Secondary Lead Slag Using Data Submitted by the Battery Council International and Association of Battery Recyclers (BCI)

I followed the methodology presented in "Final Best Demonstrated Available Technology (BDAT) Background Document For Quality Assurance/Quality Control Procedures and Methodology," dated October 23, 1991 to evaluate the data obtained from the Battery Council International and Association of Battery Recyclers (BCI). Attachment 1 presents a summary of all the data without any data manipulation.

As the first step, I removed data that had effluent concentrations that were equal to, or greater than the influent concentrations. Attachment 2 presents a summary of the remaining data. As shown in Attachment 2, I removed a significant portion of the data for antimony (60 points), arsenic (46 points), beryllium (81 points), chromium (83 points), mercury (79 points), selenium (94 points), silver (101 points), thallium (97 points), and vanadium (100 points).

In the second step, I used the Z-score test, as described in Attachment A-1 of the background document, to remove all values that fell outside of the -2.0 to +2.0 range. Based on the Z-score outlier test, I removed three antimony values, four barium values, two chromium values, one selenium value, and one zinc value. Attachment 3 presents a summary of the Z-score analysis.

I then used the BDAT methodology to calculate variability factors and treatment standards. Specifically, I followed Appendix D - Variability Factor to estimate the daily

maximum variability factor using BCI's data. Following this procedure, I used equation [1], on page D-1 to calculate VF:

$$VF = \frac{C_{99}}{Mean}$$

Where:

$$C_{99} = EXP (y + 2.33 * Sy)$$

y = the mean of the logtransformed (natural log) data
Sy = the standard deviation of the logtransformed (natural log) data
Mean = the average of the individual performance values.

As noted on page D-2 of the background document, "For residuals with concentrations that are not all below the detection limit, the 99th percentile and the mean can be estimated using equation 1".

The treatment standard for each constituent was then calculated by taking the product of the variability factor and mean constituent concentration. Attachment 4 presents both the variability factors and treatment standards calculated using BCI's data - minus both the sets of data where the effluent was equal to or greater than the influent concentrations and statistical outliers.

Lastly, I note that BCI provided insufficient information for me to (1) determine what types of treatment were being performed at each of the sites, (2) perform an accuracy correction using recovery data, and (3) know which data points were actually non-detects, as only one facility reported "less than" values for only one constituent (lead). I also note that the waste characterization data suggest that there is considerable variation in both the concentrations of the constituents of concern in the untreated waste (e.g., at facility AA, the TCLP lead concentrations in the untreated wastes are all below the TC level of 5.0 mg/L; at facility BB, the TCLP lead concentrations in the untreated wastes are either less than 0.22 mg/L or are between 120 mg/L and 835.6 mg/L; and at facilities DD and EE, the TCLP lead concentrations in the untreated waste are all between 100 mg/L and 1,017.6 mg/L) and the degree to which the treatment process(es) are optimized (e.g., the TCLP concentration of many of the constituents of concern are higher in the treated waste than what were observed in the untreated waste). In light of these potential shortcomings, EPA should consider how to best interpret and use these data.

If you have any questions regarding the attached analyses or wish to discuss the potential interpretation/use of these data, please call me at (703) 934-3656.

attachments

ATTACHMENT 1

ATTACHMENT 2

ATTACHMENT 3

ATTACHMENT 4