

March 10, 1997

MEMORANDUM

TO: Anita Cummings
FROM: Howard Finkel
SUBJECT: Final Revised Calculation of Treatment Standards Using Data Obtained From Rollins Environmental's Highway 36 Commercial Waste Treatment Facility and GNB's Frisco, Texas Waste Treatment Facility

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 both Rollins and GNB. Attachment 1 presents a summary of all the data without any data manipulation.

As the first step, I removed data that either (1) did not have both untreated (influent) and treated (effluent) characterization results, or (2) had effluent concentrations that were equal to, or greater than the influent concentrations.

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 one antimony value, one arsenic value, one barium value, two cadmium values, two chromium values, two lead values, one nickel value, one selenium value, two silver values, and one thallium value.¹ Attachment 2 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

¹ A second zinc value was removed because the [effluent] was more than 50 times higher than the next highest data point and, based on engineering judgement, suggested incomplete treatment.

maximum variability factor using both Rollins' and GNB'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". However, in cases where all of the data are reported as non-detects, I assumed that the actual values were the same as the detection limits to calculate the mean values, and then applied the standard VF of 2.8.

The treatment standard for each constituent was then calculated by taking the product of the variability factor and mean constituent concentration. Attachment 3 presents both the variability factors and treatment standards calculated using both Rollins' and GNB's data - minus the outliers, sets of data that did not have both untreated and treated data, and sets of data where the effluent was equal to or greater than the influent concentrations.

Attachment 4 presents a summary exhibit to document the final calculations and results for the combined data set (Rollins and GNB). Attachment 5 presents a comparison of the treatment standards for stabilization and HTMR. Attachment 6 presents the hand calculations conducted for chromium.

If you have any questions regarding the attached analyses, please call me at (703) 934-3656.

attachments

ATTACHMENT 1

ATTACHMENT 2

ATTACHMENT 3

ATTACHMENT 4

ATTACHMENT 5

ATTACHMENT 6