

US EPA ARCHIVE DOCUMENT

MEMORANDUM

TO: The Record

FROM: Josh Lewis, USEPA

SUBJECT: Calculation of REMERC Residual Treatment Standard Using Data Submitted by Pioneer Chlor-Alkali Company, Inc.

EPA 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 data submitted by Pioneer Chlor-Alkali Company, Inc. (“Pioneer”).

EVALUATION OF PIONEER’S DATA

We entered all of Pioneer’s data into an electronic spreadsheet for analysis and conducted the Z-score test, as outlined in Attachment A-1 of the background document, to identify any data points that fell outside of the -2.0 to +2.0 range. Based on the Z-score outlier test, three outliers were identified. Exhibit 1 presents a summary of the Z-score analysis, with the outliers in bold.

We then used the BDAT methodology to calculate the variability factors and the treatment standard. Specifically, we followed Appendix D - Variability Factor to estimate the variability factor. Following this procedure, we used equation [1] on page D-1 to calculate VF:

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

Where:

$$C_{99} = \text{EXP}(y + 2.33*S_y)$$

y= the mean of the log transformed (natural log) data
S_y= the standard deviation of the log transformed (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 used estimated using equation 1.”

The treatment standard for Pioneer’s REMERC residues was then calculated by taking the product of the variability factor and the mean constituent concentration. Exhibit 2 presents both the variability factor and the treatment standard calculated using Pioneer’s data.

Exhibit 1: Identification of Statistical Outliers Using Pioneer’s Data

Sample	Hg TCLP (mg/L)	(LN)	Z-Score	Outlier (Yes/ No)
1	0.019	-3.9633	0.1034	No
2	0.015	-4.1997	-0.3392	No
3	0.016	-4.1352	-0.2184	No
4	0.023	-3.7723	0.4611	No
5	0.02	-3.9120	0.1995	No
6	0.028	-3.5756	0.8295	No
7	0.018	-4.0174	0.0022	No
8	0.008	-4.8283	-1.5162	No
9	0.013	-4.3428	-0.6071	No
10	0.007	-4.9618	-1.7662	No
11	0.009	-4.7105	-1.2957	No
12	0.01	-4.6052	-1.0984	No
13	0.008	-4.8283	-1.5162	No
14	0.016	-4.1352	-0.2184	No
15	0.011	-4.5099	-0.9199	No
16	0.004	-5.5215	-2.8141	Yes
17	0.008	-4.8283	-1.5162	No
18	0.016	-4.1352	-0.2184	No
19	0.025	-3.6889	0.6173	No
20	0.015	-4.1997	-0.3392	No
21	0.032	-3.4420	1.0795	No
22	0.025	-3.6889	0.6173	No
23	0.04	-3.2189	1.4973	No
24	0.013	-4.3428	-0.6071	No
25	0.013	-4.3428	-0.6071	No
26	0.061	-2.7969	2.2874	Yes
27	0.023	-3.7723	0.4611	No
28	0.025	-3.6889	0.6173	No
29	0.02	-3.9120	0.1995	No
30	0.017	-4.0745	-0.1049	No
31	0.03	-3.5066	0.9586	No
32	0.023	-3.7723	0.4611	No
33	0.02	-3.9120	0.1995	No
34	0.021	-3.8632	0.2908	No
35	0.023	-3.7723	0.4611	No
36	0.011	-4.5099	-0.9199	No
37	0.024	-3.7297	0.5408	No
38	0.027	-3.6119	0.7614	No
39	0.025	-3.6889	0.6173	No
40	0.079	-2.5383	2.7716	Yes
41	0.019	-3.9633	0.1034	No
42	0.03	-3.5066	0.9586	No
43	0.017	-4.0745	-0.1049	No

44	0.02	-3.9120	0.1995	No
45	0.022	-3.8167	0.3779	No
46	0.015	-4.1997	-0.3392	No
47	0.013	-4.3428	-0.6071	No

# Obs.	47		
# of NDs	0		
Mean	0.021	-4.0185	
Std	0.013	0.5341	

Exhibit 2: Evaluation of TCLP Data Submitted by Pioneer (Eliminating Outliers)

	Hg TCLP (mg/L)	(LN)	
	0.019	-3.9633	
	0.015	-4.1997	
	0.016	-4.1352	
	0.023	-3.7723	
	0.02	-3.9120	
	0.028	-3.5756	
	0.018	-4.0174	
	0.008	-4.8283	
	0.013	-4.3428	
	0.007	-4.9618	
	0.009	-4.7105	
	0.01	-4.6052	
	0.008	-4.8283	
	0.016	-4.1352	
	0.011	-4.5099	
	0.008	-4.8283	
	0.016	-4.1352	
	0.025	-3.6889	
	0.015	-4.1997	
	0.032	-3.4420	
	0.025	-3.6889	
	0.04	-3.2189	
	0.013	-4.3428	
	0.013	-4.3428	
	0.023	-3.7723	
	0.025	-3.6889	
	0.02	-3.9120	
	0.017	-4.0745	
	0.03	-3.5066	
	0.023	-3.7723	
	0.02	-3.9120	
	0.021	-3.8632	
	0.023	-3.7723	
	0.011	-4.5099	
	0.024	-3.7297	
	0.027	-3.6119	
	0.025	-3.6889	
	0.019	-3.9633	

	0.03	-3.5066	
	0.017	-4.0745	
	0.02	-3.9120	
	0.022	-3.8167	
	0.015	-4.1997	
	0.013	-4.3428	

Average	0.019	-4.046
Std	0.007	0.411
VF	2.408	
TS	0.046	