

Appendix B

Erratum

This erratum sheet provides a correction to cadmium data and statistics in the attached report (Revised Submittal Estimated UCL95 Statistics and EPCs in Impacted Groundwater UNC Church Rock Mill & Tailings Site, Church Rock, New Mexico, December 5, 2008), which comprises Appendix B of the Updated Baseline Human Health Risk Assessment (HHRA) for UNC's Church Rock Mill and Tailings Site.

In the original report, an erroneous cadmium concentration was used to calculate the Zone 3 impacted dataset UCL95 in the Appendix B UCL95 calculations. The use of the correct value affects the previous EPC statistical calculations and the risk assessment results in the following manner:

1. An incorrect sample value of 1 mg/l was used for a sample from well EPA 14 instead of the correct value of 0.012 mg/l. The EPC calculations have been rerun in ProUCL with sample value corrected to 0.012 mg/L. The resulting UCL95/EPC estimate is 0.0075 mg/L (approximately 8 times lower than the previously reported value was 0.0628 mg/L). The following support information is attached to this sheet:
 - a. The ProUCL output utilizing the corrected dataset (the ProUCL recommended values are found in the lower right part of the output).
 - b. A revised version of Table 4 from Appendix B that reflects the correction of the Zone 3 cadmium statistics.

2. The Appendix A tables affected by this correction have been updated to reflect the correction of the Zone 3 cadmium statistics. These changes affect the results of the risk assessment in the following ways:
 - a. The revised Zone 3 impacted water cadmium UCL95 (EPC) is 0.0075 mg/L, which is lower than the background Zone 3 UCL95 (0.0113 mg/l).
 - b. The maximum Zone 3 detected value (previously 1 mg/l) has been revised to 0.015 mg/l. Because the maximum still exceeds the screening value of 0.0018 mg/l, cadmium is retained for the risk calculations for Zone 3.
 - c. The Cd HI for a child decreases from 9.1 to 1.1.
 - d. The Cd HI for an adult decreases from 3.8 to 0.5.
 - e. Cd is no longer identified to be an RCOPC because impacted concentrations are similar to background concentrations and the maximum HI (child) is approximately 1.

General UCL Statistics for Data Sets with Non-Detects

User Selected Options
 From File S:\Ewart\Projects\GE Church Rock\2009\reports\EPC statistics\revised\data\zone3_Cd_no613_corrected.wst
 Full Precision OFF
 Confidence Coefficient 95%
 Number of Bootstrap Operations 2000

Cd

General Statistics

Number of Valid Data	70	Number of Detected Data	16
Number of Distinct Detected Data	9	Number of Non-Detect Data	54
		Percent Non-Detects	77.14%

Raw Statistics

Minimum Detected	0.005
Maximum Detected	0.015
Mean of Detected	0.00956
SD of Detected	0.00278
Minimum Non-Detect	0.005
Maximum Non-Detect	0.005

Log-transformed Statistics

Minimum Detected	-5.298
Maximum Detected	-4.2
Mean of Detected	-4.693
SD of Detected	0.31
Minimum Non-Detect	-5.298
Maximum Non-Detect	-5.298

UCL Statistics

Normal Distribution Test with Detected Values Only

Lilliefors Test Statistic	0.956
5% Lilliefors Critical Value	0.887

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

DL/2 Substitution Method	
Mean	0.00411
SD	0.00326
95% DL/2 (t) UCL	0.00476

Maximum Likelihood Estimate(MLE) Method N/A

MLE yields a negative mean

Lognormal Distribution Test with Detected Values Only

Lilliefors Test Statistic	0.944
5% Lilliefors Critical Value	0.887

Data appear Lognormal at 5% Significance Level

Assuming Lognormal Distribution

DL/2 Substitution Method	
Mean	-5.695
SD	0.568
95% H-Stat (DL/2) UCL	0.00405

Log ROS Method

Mean in Log Scale -5.573

SD in Log Scale 0.659

Mean in Original Scale 0.00469

SD in Original Scale 0.00321

95% Percentile Bootstrap UCL 0.00533

95% BCA Bootstrap UCL 0.00541

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	9.632
Theta Star	0.00099
nu star	308.2

A-D Test Statistic 0.393

5% A-D Critical Value 0.739

K-S Test Statistic 0.739

5% K-S Critical Value 0.215

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data

Minimum 0.00361

Maximum 0.0186

Mean 0.0131

Median 0.0138

SD 0.00395

k star 8.607

Theta star 0.00153

Nu star 1205

AppChi2 1125

95% Gamma Approximate UCL 0.0141

95% Adjusted Gamma UCL 0.0141

Data Distribution Test with Detected Values Only

Data appear Normal at 5% Significance Level

Nonparametric Statistics

Kaplan-Meier (KM) Method

Mean 0.00604

SD 0.00231

SE of Mean 0.0002849

95% KM (t) UCL 0.00652

95% KM (z) UCL 0.00651

95% KM (jackknife) UCL 0.00666

95% KM (bootstrap t) UCL 0.00658

95% KM (BCA) UCL 0.00781

95% KM (Percentile Bootstrap) UCL 0.0075

95% KM (Chebyshev) UCL 0.00728

97.5% KM (Chebyshev) UCL 0.00782

99% KM (Chebyshev) UCL 0.00888

Potential UCLs to Use

95% KM (t) UCL 0.00652

95% KM (Percentile Bootstrap) UCL 0.0075

Note: DL/2 is not a recommended method.

TABLE 4 (Revised Jan. 2012)

Summary Statistics for COPCs and Trace Metals in Zone 3 Impacted Groundwater, Recent 8 Quarters
3rd Qtr. 2006 - 2nd Qtr. 2008, Excluding Samples from Section 2 Well 0613

Parameter	Units	Total Data	Percent Nondetect	Minimum Detected	Maximum Detected	Mean of Detected	Median of Detected	UCL95 of Mean
Al	mg/L	70	17.1%	0.1	163	16.14	2.45	39.15
As	mg/L	70	31.4%	0.001	2.5	0.206	0.025	0.412
Be	mg/L	70	87.1%	0.01	0.09	0.0589	0.06	0.0202
Cd	mg/L	70	77.1%	0.005	0.015	0.00956	0.0095	0.0075
Co	mg/L	70	0.0%	0.05	0.95	0.381	0.35	0.439
Pb	mg/L	70	100.0%	N/A	N/A	N/A	N/A	N/A
Mn	mg/L	70	0.0%	3.33	23.7	9.836	7.485	10.89
Mo	mg/L	70	54.3%	0.1	5	1.084	0.3	0.739
Ni	mg/L	70	0.0%	0.11	0.89	0.377	0.31	0.489
Se	mg/L	70	95.7%	0.001	0.01	0.00433	0.002	0.0014
V	mg/L	70	92.9%	0.1	0.2	0.18	0.2	0.111
Cl	mg/L	70	0.0%	14	98	43.66	37.5	48.01
SO4	mg/L	70	0.0%	2630	5260	3599	3545	3717
NO3_as_N	mg/L	70	61.4%	0.1	44.8	17.15	24	16.09
U	mg/L	70	0.0%	0.0011	0.138	0.0287	0.0219	0.0431
Chloroform	mg/L	70	81.4%	0.00093	0.00676	0.00441	0.00444	0.00326
Lab_TDS	mg/L	70	0.0%	3980	6680	5289	5290	5441
Rad-226	pCi/L	70	0.0%	2	27.6	9.823	7.9	11.14
Rad-228	pCi/L	70	0.0%	3.8	56.1	15.73	13.55	17.84
Rad_totl	pCi/L	70	0.0%	6.8	73.3	25.55	20.8	29.14
Th-230	pCi/L	70	91.4%	0.2	1.3	0.533	0.4	0.259
Pb-210	pCi/L	70	91.4%	1.8	8.1	4.883	4.9	2.287
Gross_Alpha	pCi/L	70	0.0%	2.4	35.2	12.62	10.55	14.25
Sb	mg/L	0	N/A	N/A	N/A	N/A	N/A	N/A
Ba	mg/L	0	N/A	N/A	N/A	N/A	N/A	N/A
Cr	mg/L	0	N/A	N/A	N/A	N/A	N/A	N/A
Cu	mg/L	0	N/A	N/A	N/A	N/A	N/A	N/A
Fe	mg/L	0	N/A	N/A	N/A	N/A	N/A	N/A
Hg	mg/L	0	N/A	N/A	N/A	N/A	N/A	N/A
Ag	mg/L	0	N/A	N/A	N/A	N/A	N/A	N/A
Tl	mg/L	0	N/A	N/A	N/A	N/A	N/A	N/A
Zn	mg/L	0	N/A	N/A	N/A	N/A	N/A	N/A

Notes:

N/A - insufficient data to make an estimate.

UCL95 statistics highlighted in yellow may be of questionable reliability.

Li(Cd Results Revised Jan. 2012)sted UCL statistics for Al, As, and NO3_as_N are at 97.5% confidence level