APPENDIX J

CORRECTIVE ACTION REQUESTS AND FIELD CHANGE REQUESTS

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Attachment C

CORRECTIVE ACTION REQUEST	**NO CAR_Croft_001**

USACE Representative: Debra Edwards
Date Issued: 05 April 2012
Issued to: Zapata, Inc.
Response Due: 02 May 2012
Contract# and T.O.: W912DY-10-D-0028 TO 0005
Project Name/Location: Former Camp Croft, Spartanburg, SC, RI/FS

Nonconformance Type (circle one): Critical Major Minor

Description of Condition Found:

The Work Plan was not followed.

- Non ferrous anomalies, such as small arms, have been discriminated out and were not being dug along the mag-and dig transects. The crew demonstrated a method during the site visit on February 27 where anomalies would initially be detected using an all metals detector and then they would be re-checked with a magnetometer to determine whether or not to dig it. This procedure is not in the Work Plan. The Work Plan states that crews will dig all anomalies. If a significant number of anomalies are encountered, there is a procedure for reducing the number of anomalies. However, this procedure was not followed.

Work Plan states:
"3.4.6.1.2 Along mag-and-dig transects, crews will dig all anomalies encountered with the transect path (nominal width of one meter), and paths will go around any large obstacles (such a trees, wetlands, large rocks, etc.)."

Contractor Representative Signature (Noting that CAR Received):

(The Contractor will provide the following information to the Contracting Officer and USACE PM by the "Response Due" date above. Please contact the USACE Representative listed above if you have any questions)

Actual Cause: (Contractor will investigate and determine cause of condition reported above. Actual cause should be stated as specifically as possible)

Please see

Form 1401, 23 Feb 04

Attachment C

CORRECTIVE ACTION REQUEST | **NO CAR_Croft_001**
Action Taken to Correct Condition: (Corrective Action should address root cause, not the symptom) Please see
Action Taken to Prevent Recurrence: Please see
Action Taken to Monitor Effectiveness of Corrective Action: (Generate data as proof. State the monitoring method put in place and who is responsible for reviewing data.) Please see
Contractor Representative Signature/Title/Date Signed: (Form must be signed before returning)
(USACE Project Team Use Only) Review of Corrective Action: 1) Has condition improved? ___ Yes ___ No 2) Additional corrective action required? ___ Yes ___ No Comments: Completed form provided to Contracting Officer: (Date)

Form 1401, 23 Feb 04

Corrective Action Request Response

NO: CAR_Croft_001

The following provides ZAPATA's response to the Corrective Action Request (CAR) received by ZAPATA on 18 April 2012.

Actual Cause:

During a field demonstration of mag-and-dig transect investigation procedures to the RAB and USAESCH representatives on 27 February 2012, ZAPATA's SUXOS provided an explanation of the work process in layman's terms for the benefit of the RAB members. During that explanation, the SUXOS over-simplified and loosely explained our work procedures. That explanation included a description of how ZAPATA uses multiple handheld sensors for anomaly detection, particularly in areas saturated with small arms. ZAPATA does not dispute the description documented in the CAR. ZAPATA understands that following approved procedures in the Work Plans is critical to effective project completion in a manner acceptable to the USAESCH. We believe that supplemental use of the Schonstedt, particularly in areas with high quantities of small arms may have given USAESCH representatives the perception that field teams are allowed to discriminate small arms from MEC/MD. This belief may have been further supported by later observations of small arms left in place along mag-and-dig transects. .

Action Taken to Correct Condition:

The ZAPATA project team (PM, SUXOS, UXOQCS, and QA Manager) have met and discussed the details provided in the CAR. Despite the confusion regarding the procedures described at the field demonstration, the SUXOS has assured the management team that field teams are following the procedures described in the Work Plan and that supplemental use of the Schonstedt is meant to provide addition information rather than substitute for the All-Whites detector. However, there is a practical nature to the work being done on-site. In discussions with the USAESCH, ZAPATA has attempted to communicate that small arms use at the former Camp Croft is ubiquitous. As such, field teams are attempting to complete the required investigations despite the complication of small arms findings, which is difficult in some locations. ZAPATA will provide more comprehensive documentation describing areas with high quantities of small arms. ZAPATA has performed a field review of numerous transects where small arms were identified during QC operations and in a second, independent field review. The ZAPATA management team has reiterated the proper procedure (i.e., digging all anomalies encountered along mag-and-dig transects) to the field teams.

Action Taken to Prevent Recurrence:

ZAPATA has shared the challenge among its project managers to educate them in preparation for future investigations. ZAPATA is actively developing new protocols to be implemented in Work Plans to ensure this type of confusion is avoided on future investigations; these are documented in our corporate Lessons-Learned database.

Action Taken to Monitor Effectiveness of Corrective Action:

The ZAPATA SUXOS and UXOQCS are more closely monitoring field teams for proper procedures, including observing the teams during site activities to ensure all anomalies along mag-and-dig transects are being investigated, areas of concentrated SA are well documented, and equipment is being used as designed in the Work Plans. During QC inspection, the UXOQCS is comparing data collected from the field teams with data collected during his inspection. Those data are being reviewed by the SUXOS and the PM.

Contractor Representative Signature/Title/Date Signed (document is signed):

Jason Shiflet, P.G., Director of Operations, MRS/ECRS Division, 01 May 2012

Michael Winningham, Vice President, MRS/ECRS Division, 01 May 2012

FCR No. 01

FIELD CHANGE REQUEST	
Project: Former Camp Croft RI/FS **Location:** Spartanburg, SC	**Contract No.:** W91DY-10-D-0028 **Task Order No.:** 0005
Proposed Activity in Scope: ☒ **YES** ☐ **NO**	**Order of Magnitude Cost Estimate to Implement Change:**
Task/Subtask(s) Affected: Task 004 – Field Activities	**Potential Schedule Impact of Change:** ☐ **YES** ☒ **NO** (If yes, number of workdays:)
Affected Document(s): Final Work Plans for the Remedial Investigation/Feasibility Study (RI/FS), Former Camp Croft, Spartanburg, South Carolina dated September 9, 2011.	
Activity/Change Description: There are references in the Work Plan to leaving intrusive investigation holes along mag-and-dig transects open for follow-on inspection.	
Recommendations: All holes will be filled.	
Internal Approval/Acknowledgement	
Prepared by: Jason Shiflet **Date:** 02/14/2012	**Approved by:** Michael Winningham **Date:** 02/14/2012
USAESCH Approval *(Note: Approval does not consent to funding; consent to execute FCR only.)*	
Approved by: _____ Signature and Date	**Distribution:** Spencer O'Neal Teresa Carpenter
USAESCH Comments:	

FCR No. 02

FIELD CHANGE REQUEST	
Project: Former Camp Croft RI/FS **Location:** Spartanburg, SC	**Contract No.:** W91DY-10-D-0028 **Task Order No.:** 0005
Proposed Activity in Scope: ☒ **YES** ☐ **NO**	**Order of Magnitude Cost Estimate to Implement Change:**
Task/Subtask(s) Affected: Task 012 – Environmental Sampling	**Potential Schedule Impact of Change:** ☐ **YES** ☒ **NO** (If yes, number of workdays:)
Affected Document(s): Final Work Plans (Appendix E: UFP-QAPP) for the Remedial Investigation/Feasibility Study (RI/FS), Former Camp Croft, Spartanburg, South Carolina dated September 9, 2011.	
Activity/Change Description: There are references in the QAPP Worksheets #14, #17, and #18 that call for Pre-blow-in-place (BIP) samples to be collected where ordnance is found that requires in-place detonation.	
Recommendations: From discussions with the PDT, the recommendation is that Pre-BIP samples are not required. The PDT agreed with eliminating Pre-BIP samples during a conference call on 11 April 2012.	
Internal Approval/Acknowledgement	
Prepared by: Stephen Conrad **Date:** 04/12/2012	**Approved by:** Michael Winningham **Date:** 04/12/2012
USAESCH Approval *(Note: Approval does not consent to funding; consent to execute FCR only.)*	
Approved by: _____ Signature and Date	**Distribution:** Spencer O'Neal Teresa Carpenter
USAESCH Comments:	

FIELD CHANGE REQUEST	
Project: Former Camp Croft RI/FS **Location:** Spartanburg, SC	**Contract No.:** W91DY-10-D-0028 **Task Order No.:** 0005
Proposed Activity in Scope: ☒ **YES** ☐ **NO**	**Order of Magnitude Cost Estimate to Implement Change:**
Task/Subtask(s) Affected: Task 004 – Field Activities	**Potential Schedule Impact of Change:** ☐ **YES** ☒ **NO** (If yes, number of workdays:)
Affected Document(s): Final Work Plans for the Remedial Investigation/Feasibility Study (RI/FS), Former Camp Croft, Spartanburg, South Carolina dated September 9, 2011.	
Activity/Change Description: Section 3.4.8.2, titled Selection of Analog Anomalies in High Density Transect Segments, describes how the field teams will perform data collection along mag-and-dig transects when there are an inordinate number of anomalies. In particular, the process describes the method by which the team will switch to AIR until anomaly densities fall below 50 anomalies per 100 ft segment. The PDT involvement in that section is not well explained.	
Recommendations: To clarify the process and allow for adequate PDT involvement, ZAPATA recommends the following edits to the last sentence in that section. "Upon discovery of the high anomaly concentration, the ZAPATA SUXOS will notify the ZAPATA PM, who will immediately notify and confer with the PDT to determine how to adequately investigate high anomaly density transect segments; this may involve investigating a statistically-derived subsample of the recorded anomalies along those segments. Alternatively, the PDT may determine that mag-and-dig operations along the entire segment(s) are preferred. ZAPATA will complete the investigation of designated high density segments, in a timely manner."	
Internal Approval/Acknowledgement	
Prepared by: Jason Shiflet **Date:** 04/12/2012	**Approved by:** Michael Winningham **Date:** 04/12/2012
USAESCH Approval *(Note: Approval does not consent to funding; consent to execute FCR only.)*	
Approved by: _____ Signature and Date **USAESCH Comments:**	**Distribution:** Spencer O'Neal Teresa Carpenter

FCR No. 04

FIELD CHANGE REQUEST	
Project: Former Camp Croft RI/FS **Location:** Spartanburg, SC	**Contract No.:** W91DY-10-D-0028 **Task Order No.:** 0005
Proposed Activity in Scope: ☒ **YES** ☐ **NO**	**Order of Magnitude Cost Estimate to Implement Change:**
Task/Subtask(s) Affected: Task 004 – Field Activities	**Potential Schedule Impact of Change:** ☐ **YES** ☒ **NO** (If yes, number of workdays:)
Affected Document(s): Final Work Plans for the Remedial Investigation/Feasibility Study (RI/FS), Former Camp Croft, Spartanburg, South Carolina dated September 9, 2011.	
Activity/Change Description: There are references in the Work Plan that state we will sample all Post-BIP locations using the 7-wheel composite method from designated locations. However, it does not take into consideration if the item was MEC or MD (i.e., practice).	
Recommendations: It is recommended that Post-BIP samples will not be taken from locations where we BIP if the item turned out to be MD (i.e., practice). Post-BIP samples will only be taken if the item was MEC.	
Internal Approval/Acknowledgement	
Prepared by: Eric Abiecunas **Date:** 05/01/2012	**Approved by:** Michael Winningham **Date:** 05/01/2012
USAESCH Approval *(Note: Approval does not consent to funding; consent to execute FCR only.)*	
Approved by: _____ Signature and Date	**Distribution:** Spencer O'Neal Teresa Carpenter
USAESCH Comments:	

FCR No. 05

FIELD CHANGE REQUEST	
Project: Former Camp Croft **Location:** Spartanburg, SC	**Contract No.:** W91DY-10-D-0028 **Task Order No.:** 0005
Proposed Activity in Scope: ☒ **YES** ☐ **NO**	**Order of Magnitude Cost Estimate to Implement Change:**
Task/Subtask(s) Affected: Task 0004 – Field Activities	**Potential Schedule Impact of Change:** ☐ **YES** ☒ **NO** (If yes, number of workdays:)
Affected Document(s): Final Work Plans for the Remedial Investigation/Feasibility Study (RI/FS), Former Camp Croft, Spartanburg, South Carolina dated September 9, 2011.	
Activity/Change Description: We have defined "lot" as 200 anomalies. We would also like to designate single grids as a "lot," which will change our QC criteria.	
Recommendations: Each individual grid will also be considered a lot. As such, the number of anomalies in that grid may require we adjust the specific QC requirements. ZAPATA's UXOQCS will refer to Table D-5 in WERS-DID 004.01 to determine the appropriate QC requirements.	
Internal Approval/Acknowledgement	
Prepared by: Nathan Reel **Date:** 05/04/2012	**Approved by:** Michael Winningham **Date:** 05/04/2012
USAESCH Approval *(Note: Approval does not consent to funding; consent to execute FCR only.)*	
Approved by: _____ Signature and Date	**Distribution:** Spencer O'Neal Teresa Carpenter
USAESCH Comments:	

FCR No. 06

FIELD CHANGE REQUEST	
Project: Former Camp Croft RI/FS **Location:** Spartanburg, SC	**Contract No.:** W91DY-10-D-0028 **Task Order No.:** 0005
Proposed Activity in Scope: ☒ **YES** ☐ **NO**	**Order of Magnitude Cost Estimate to Implement Change:**
Task/Subtask(s) Affected: Task 004 – Field Activities	**Potential Schedule Impact of Change:** ☐ **YES** ☒ **NO** (If yes, number of workdays:)
Affected Document(s): Final Work Plans for the Remedial Investigation/Feasibility Study (RI/FS), Former Camp Croft, Spartanburg, South Carolina dated September 9, 2011.	
Activity/Change Description: In areas where AIR was performed, ZAPATA is currently tasked to clear all grids' anomalies using mag-and-dig techniques. Some of these grids contain large quantities of small arms or cultural debris, no MEC, and little to no MD. We need a mechanism to evaluate our grid clearance process, so that we're using that labor effectively.	
Recommendations: For those grids designated for mag-and-dig investigation, ZAPATA will intrusively investigation 25% of the grid area. If during that process, only small arms or cultural debris are encountered and no MEC and very little MD are encountered, Zapata will pause activities in that grid and present those findings to the PDT for assessment. The PDT will evaluate the findings and determine if continued activities in that grid are necessary.	
Internal Approval/Acknowledgement	
Prepared by: Nathan Reel **Date:** 05/04/2012	**Approved by:** Michael Winningham **Date:** 05/04/2012
USAESCH Approval *(Note: Approval does not consent to funding; consent to execute FCR only.)*	
Approved by: _____ Signature and Date	**Distribution:** Spencer O'Neal Teresa Carpenter
USAESCH Comments:	

FCR No. 07

FIELD CHANGE REQUEST	
Project: Former Camp Croft RI/FS **Location:** Spartanburg, SC	**Contract No.:** W91DY-10-D-0028 **Task Order No.:** 0005
Proposed Activity in Scope: ☒ **YES** ☐ **NO**	**Order of Magnitude Cost Estimate to Implement Change:**
Task/Subtask(s) Affected: Task 004 – Field Activities	**Potential Schedule Impact of Change:** ☐ **YES** ☒ **NO** (If yes, number of workdays:)
Affected Document(s): Final Work Plans for the Remedial Investigation/Feasibility Study (RI/FS), Former Camp Croft, Spartanburg, South Carolina dated September 9, 2011.	
Activity/Change Description: In the CSM, ZAPATA originally identified specific areas for mag-and-dig investigation and other areas for AIR investigation. As fieldwork progresses and data is collected, there needs to be a method that allows the PDT to convert AIR transects into mag-and-dig transects or extend mag-and-dig transects beyond current boundaries, as needed, in order to characterize nature and extent.	
Recommendations: If new information on an area is received that may be pertinent to the method of investigation used, the PDT will evaluate the area to determine whether mag-and-dig or AIR investigation techniques are better used to characterize both nature and extent.	
Internal Approval/Acknowledgement	
Prepared by: Stephen Conrad **Date:** 05/14/2012	**Approved by:** Michael Winningham **Date:** 05/15/2012
USAESCH Approval *(Note: Approval does not consent to funding; consent to execute FCR only.)*	
Approved by: _____ Signature and Date	**Distribution:** Spencer O'Neal Teresa Carpenter
USAESCH Comments:	

FCR No. 08

FIELD CHANGE REQUEST	
Project: Former Camp Croft RI/FS **Location:** Spartanburg, SC	**Contract No.:** W91DY-10-D-0028 **Task Order No.:** 0005
Proposed Activity in Scope: ☒ **YES** ☐ **NO**	**Order of Magnitude Cost Estimate to Implement Change:**
Task/Subtask(s) Affected: Task 004 – Field Activities	**Potential Schedule Impact of Change:** ☐ **YES** ☒ **NO** (If yes, number of workdays:)
Affected Document(s): Final Work Plans for the Remedial Investigation/Feasibility Study (RI/FS), Former Camp Croft, Spartanburg, South Carolina dated September 9, 2011.	
Activity/Change Description: ZAPATA originally planned to dig 100% of the anomalies selected in each DGM grid. In some cases, grids have been placed in areas with high concentrations of MD. Those grids require lengthy investigation efforts, beyond what may be necessary to achieve characterization objectives. If the PDT determines that a grid contains a high concentration of MD, a new approach will be used to evaluate that grid as described below.	
Recommendations: The grid will be divided into 4 equal quadrants. 100% of the selected targets in one quadrant will be dug. Only the targets in the other 3 quadrants with distinctly different characteristics will be dug. If the nature of the grid can be determined with these findings and no new types of discoveries are found in the final 3 quadrants, the grid will be considered complete.	
Internal Approval/Acknowledgement	
Prepared by: Stephen Conrad **Date:** 08/09/12	**Approved by:** Jason Shiflet **Date:** 08/10/12
USAESCH Approval *(Note: Approval does not consent to funding; consent to execute FCR only.)*	
Approved by: _____ Signature and Date	**Distribution:** Spencer O'Neal Teresa Carpenter
USAESCH Comments:	

FCR No. 09

FIELD CHANGE REQUEST	
Project: Former Camp Croft RI/FS **Location:** Spartanburg, SC	**Contract No.:** W91DY-10-D-0028 **Task Order No.:** 0005
Proposed Activity in Scope: ☒ **YES** ☐ **NO**	**Order of Magnitude Cost Estimate to Implement Change:**
Task/Subtask(s) Affected: Task 004 – Field Activities	**Potential Schedule Impact of Change:** ☐ **YES** ☒ **NO** (If yes, number of workdays:)
Affected Document(s): Final Work Plans for the Remedial Investigation/Feasibility Study (RI/FS), Former Camp Croft, Spartanburg, South Carolina dated September 9, 2011.	
Activity/Change Description: The Final Work Plans state that there will be 10 discrete MC soil samples collected in each of the following investigation areas for a total of 120 discrete samples: MRS 2, MRS 3, AoPI 3, AoPI 5, AoPI 8, AoPI 9E, AoPI 9G, AoPI 10A, AoPI 10B, AoPI 11B, AoPI 11C, and AoPI 11D. Since we did not find significant amounts of MD or did not have access in some of these areas, the PDT has decided to re-allocate some of the sampling locations.	
Recommendations: The 120 discrete MC soil samples will be collected at 24 different locations where the highest amounts of MD were found during grid investigations. At each location, 5 samples will be collected. One sample will be collected at the center of the entire grid, and the other 4 samples will be collected at the center of each of the 4 equally divided grid quadrants.	
Internal Approval/Acknowledgement	
Prepared by: Stephen Conrad **Date:** 08/24/12	**Approved by:** Jason Shiflet **Date:** 08/27/12
USAESCH Approval *(Note: Approval does not consent to funding; consent to execute FCR only.)*	
Approved by: _____ Signature and Date	**Distribution:** Spencer O'Neal Teresa Carpenter
USAESCH Comments:	

FIELD CHANGE REQUEST	
Project: Former Camp Croft RI/FS **Location:** Spartanburg, SC	**Contract No.:** W91DY-10-D-0028 **Task Order No.:** 0005
Proposed Activity in Scope: ☒ **YES** ☐ **NO**	**Order of Magnitude Cost Estimate to Implement Change:**
Task/Subtask(s) Affected: Task 004 – Field Activities	**Potential Schedule Impact of Change:** ☐ **YES** ☒ **NO** (If yes, number of workdays:)
Affected Document(s): Final Work Plans for the Remedial Investigation/Feasibility Study (RI/FS), Former Camp Croft, Spartanburg, South Carolina dated September 9, 2011.	
Activity/Change Description: The Project Action Limits (PALs) approved in the Final Work Plans are being revised. The PDT has decided to modify the PALs to align with the EPA Regional Screening Levels (RSLs; found at http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/) due to the fact that South Carolina does not have its own limits and adopts EPA guidelines. Note: EPA Region 4's RSLs were adopted from the above website.	
Recommendations: The EPA Regional RSLs (attached) will be used for initial screening against sampling results to identify any exceedances. Those samples having results in exceedance of the Regional RSLs will then be compared with more conservative Baseline Risk Levels to be presented in the Human Health and Ecological Risk Assessments.	
Internal Approval/Acknowledgement	
Prepared by: Stephen Conrad **Date:** 02/14/13	**Approved by:** Jason Shiflet **Date:** 2/15/13
USAESCH Approval *(Note: Approval does not consent to funding; consent to execute FCR only.)*	
Approved by: _____ Signature and Date	**Distribution:** Spencer O'Neal Teresa Carpenter
USAESCH Comments:	

Field Change Request No. 10 – Revised Project Action Limits (01 February 13)

Analyte	CAS No.	Project Action Limits (mg/kg)			
		Current[1]	Resident Soil[2]	2μ Background[3]	Recommended
Antimony (Sb)	7440-36-0	0.66	31	0.304	31
Copper (Cu)	7440-50-8	51	3,100	33.10	3,100
Lead (Pb)	7439-92-1	14	400	74.82	400
Zinc (Zn)	7440-66-6	680	23,000	147.94	23,000

[1] Based on the Risk-based SSL (or MCL-based SSL for lead) for Protection of Groundwater from the EPA Regional Screening Level (RSL) Summary Table dated June 2011.
[2] Based on the Resident Soil RSL from the EPA Regional Screening Level (RSL) Summary Table dated November 2012.
[3] Represents two times the arithmetic mean (μ) from background samples (ProUCL Version 4.1).

FIELD CHANGE REQUEST	
Project: Former Camp Croft RI/FS **Location:** Spartanburg, SC	**Contract No.:** W91DY-10-D-0028 **Task Order No.:** 0005
Proposed Activity in Scope: ☒ **YES** ☐ **NO**	**Order of Magnitude Cost Estimate to Implement Change:**
Task/Subtask(s) Affected: Task 004 – Field Activities	**Potential Schedule Impact of Change:** ☐ **YES** ☒ **NO** (If yes, number of workdays:)
Affected Document(s): Final Work Plans for the Remedial Investigation/Feasibility Study (RI/FS), Former Camp Croft, Spartanburg, South Carolina dated September 9, 2011.	
Activity/Change Description: The Project Action Limits (PALs) approved in the Final Work Plans are being revised. The PDT has decided to modify the PALs to align with the EPA Regional Screening Levels (RSLs; found at http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/) due to the fact that South Carolina does not have its own limits and adopts EPA guidelines. Note: EPA Region 4's RSLs were adopted from the above website.	
Recommendations: The EPA Regional RSLs (attached) will be used for initial screening against sampling results to identify any exceedances. Those samples having results in exceedance of the Regional RSLs will then be compared with more conservative Baseline Risk Levels to be presented in the Human Health and Ecological Risk Assessments.	
Internal Approval/Acknowledgement	
Prepared by: Stephen Conrad **Date:** 02/14/13	**Approved by:** Jason Shiflet **Date:** 2/15/13
USAESCH Approval *(Note: Approval does not consent to funding; consent to execute FCR only.)*	
Approved by: _____ Signature and Date	**Distribution:** Spencer O'Neal Teresa Carpenter
USAESCH Comments:	

	0	1	2	3
	Antimony	Copper	Lead	Zinc
1	0.085	16	25.6	42.6
2	0.036	11.5	7.9	12
3	0.4	25.7	27	159
4	0.028	9.5	16.6	30.7
5	0.038	6.6	21.5	24.8
6	0.25	17.5	56.8	123
7	0.083	16.1	26.5	40.5
8	0.57	27.8	43.4	127
9	0.064	11.5	40	56.9
10	0.098	17.3	125	92.2
11	0.023	22.5	21.2	105

	General Background Statistics for Full Data Sets
User Selected Options	
From File	W:\Projects\Huntsville_WERS_2010\Camp Croft RIFS\Documents\Work Plans\Final\Field Change Reque
Full Precision	OFF
Confidence Coefficient	95%
Coverage	90%
Different or Future K Values	1
Number of Bootstrap Operations	2000

Antimony

General Statistics

Total Number of Observations	11	Number of Distinct Observations	11
Tolerance Factor	2.275		

Raw Statistics		**Log-Transformed Statistics**	
Minimum	0.023	Minimum	-3.772
Maximum	0.57	Maximum	-0.562
Second Largest	0.4	Second Largest	-0.916
First Quartile	0.037	First Quartile	-3.297
Median	0.083	Median	-2.489
Third Quartile	0.174	Third Quartile	-1.855
Mean	0.152	Mean	-2.439
Geometric Mean	0.0872	SD	1.077
SD	0.18		
Coefficient of Variation	1.182		
Skewness	1.683		

Background Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.735	Shapiro Wilk Test Statistic	0.923
Shapiro Wilk Critical Value	0.85	Shapiro Wilk Critical Value	0.85
Data not Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% UTL with 90% Coverage	0.562	95% UTL with 90% Coverage	1.012
95% UPL (t)	0.493	95% UPL (t)	0.67
90% Percentile (z)	0.383	90% Percentile (z)	0.347
95% Percentile (z)	0.448	95% Percentile (z)	0.513
99% Percentile (z)	0.571	99% Percentile (z)	1.069
Gamma Distribution Test		**Data Distribution Test**	
k star	0.811	**Data appear Gamma Distributed at 5% Significance Level**	
Theta Star	0.188		
MLE of Mean	0.152		
MLE of Standard Deviation	0.169		
nu star	17.85		
A-D Test Statistic	0.654	**Nonparametric Statistics**	
5% A-D Critical Value	0.751	90% Percentile	0.4
K-S Test Statistic	0.257	95% Percentile	0.485

5% K-S Critical Value	0.262	99% Percentile	0.553
Data appear Gamma Distributed at 5% Significance Level			
Assuming Gamma Distribution		95% UTL with 90% Coverage	0.57
90% Percentile	0.369	95% Percentile Bootstrap UTL with 90% Coverage	0.57
95% Percentile	0.492	95% BCA Bootstrap UTL with 90% Coverage	0.57
99% Percentile	0.78	95% UPL	0.57
		95% Chebyshev UPL	0.972
95% WH Approx. Gamma UPL	0.545	Upper Threshold Limit Based upon IQR	0.38
95% HW Approx. Gamma UPL	0.563		
95% WH Approx. Gamma UTL with 90% Coverage	0.696		
95% HW Approx. Gamma UTL with 90% Coverage	0.741		

Copper

General Statistics			
Total Number of Observations	11	Number of Distinct Observations	10
Tolerance Factor	2.275		
Raw Statistics		**Log-Transformed Statistics**	
Minimum	6.6	Minimum	1.887
Maximum	27.8	Maximum	3.325
Second Largest	25.7	Second Largest	3.246
First Quartile	11.5	First Quartile	2.442
Median	16.1	Median	2.779
Third Quartile	20	Third Quartile	2.988
Mean	16.55	Mean	2.725
Geometric Mean	15.25	SD	0.437
SD	6.689		
Coefficient of Variation	0.404		
Skewness	0.333		
Background Statistics			
Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.956	Shapiro Wilk Test Statistic	0.958
Shapiro Wilk Critical Value	0.85	Shapiro Wilk Critical Value	0.85
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% UTL with 90% Coverage	31.76	95% UTL with 90% Coverage	41.21
95% UPL (t)	29.21	95% UPL (t)	34.88
90% Percentile (z)	25.12	90% Percentile (z)	26.7
95% Percentile (z)	27.55	95% Percentile (z)	31.29
99% Percentile (z)	32.11	99% Percentile (z)	42.15
Gamma Distribution Test		**Data Distribution Test**	
k star	4.649	Data appear Normal at 5% Significance Level	
Theta Star	3.559		
MLE of Mean	16.55		
MLE of Standard Deviation	7.674		

nu star	102.3		
A-D Test Statistic	0.233	Nonparametric Statistics	
5% A-D Critical Value	0.731	90% Percentile	25.7
K-S Test Statistic	0.156	95% Percentile	26.75
5% K-S Critical Value	0.256	99% Percentile	27.59
Data appear Gamma Distributed at 5% Significance Level			
Assuming Gamma Distribution		95% UTL with 90% Coverage	27.8
90% Percentile	26.82	95% Percentile Bootstrap UTL with 90% Coverage	27.8
95% Percentile	30.85	95% BCA Bootstrap UTL with 90% Coverage	27.8
99% Percentile	39.38	95% UPL	27.8
		95% Chebyshev UPL	47
95% WH Approx. Gamma UPL	32.02	Upper Threshold Limit Based upon IQR	32.75
95% HW Approx. Gamma UPL	32.59		
95% WH Approx. Gamma UTL with 90% Coverage	36.29		
95% HW Approx. Gamma UTL with 90% Coverage	37.25		

Lead

General Statistics			
Total Number of Observations	11	Number of Distinct Observations	11
Tolerance Factor	2.275		

Raw Statistics		Log-Transformed Statistics	
Minimum	7.9	Minimum	2.067
Maximum	125	Maximum	4.828
Second Largest	56.8	Second Largest	4.04
First Quartile	21.35	First Quartile	3.061
Median	26.5	Median	3.277
Third Quartile	41.7	Third Quartile	3.73
Mean	37.41	Mean	3.376
Geometric Mean	29.27	SD	0.712
SD	32.06		
Coefficient of Variation	0.857		
Skewness	2.346		

Background Statistics			
Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.731	Shapiro Wilk Test Statistic	0.962
Shapiro Wilk Critical Value	0.85	Shapiro Wilk Critical Value	0.85
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% UTL with 90% Coverage	110.3	95% UTL with 90% Coverage	147.9
95% UPL (t)	98.1	95% UPL (t)	112.7
90% Percentile (z)	78.49	90% Percentile (z)	72.89
95% Percentile (z)	90.14	95% Percentile (z)	94.42
99% Percentile (z)	112	99% Percentile (z)	153.4

Gamma Distribution Test		Data Distribution Test	
k star	1.653	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	22.63		
MLE of Mean	37.41		
MLE of Standard Deviation	29.1		
nu star	36.36		
A-D Test Statistic	0.474	Nonparametric Statistics	
5% A-D Critical Value	0.738	90% Percentile	56.8
K-S Test Statistic	0.225	95% Percentile	90.9
5% K-S Critical Value	0.258	99% Percentile	118.2
Data appear Gamma Distributed at 5% Significance Level			
Assuming Gamma Distribution		95% UTL with 90% Coverage	125
90% Percentile	76.14	95% Percentile Bootstrap UTL with 90% Coverage	125
95% Percentile	94.36	95% BCA Bootstrap UTL with 90% Coverage	125
99% Percentile	135.3	95% UPL	125
		95% Chebyshev UPL	183.4
95% WH Approx. Gamma UPL	100.7	Upper Threshold Limit Based upon IQR	72.23
95% HW Approx. Gamma UPL	102.5		
95% WH Approx. Gamma UTL with 90% Coverage	121.5		
95% HW Approx. Gamma UTL with 90% Coverage	125.5		

Zinc

General Statistics			
Total Number of Observations	11	Number of Distinct Observations	11
Tolerance Factor	2.275		
Raw Statistics		**Log-Transformed Statistics**	
Minimum	12	Minimum	2.485
Maximum	159	Maximum	5.069
Second Largest	127	Second Largest	4.844
First Quartile	35.6	First Quartile	3.563
Median	56.9	Median	4.041
Third Quartile	114	Third Quartile	4.733
Mean	73.97	Mean	4.047
Geometric Mean	57.23	SD	0.812
SD	49.26		
Coefficient of Variation	0.666		
Skewness	0.415		
Background Statistics			
Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.924	Shapiro Wilk Test Statistic	0.942
Shapiro Wilk Critical Value	0.85	Shapiro Wilk Critical Value	0.85
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% UTL with 90% Coverage	186	95% UTL with 90% Coverage	363.1

				95% UPL (t)	167.2				95% UPL (t)	266.2
				90% Percentile (z)	137.1				90% Percentile (z)	162
				95% Percentile (z)	155				95% Percentile (z)	217.6
				99% Percentile (z)	188.6				99% Percentile (z)	378.5
				Gamma Distribution Test					**Data Distribution Test**	
				k star	1.588				**Data appear Normal at 5% Significance Level**	
				Theta Star	46.59					
				MLE of Mean	73.97					
				MLE of Standard Deviation	58.71					
				nu star	34.93					
				A-D Test Statistic	0.3				**Nonparametric Statistics**	
				5% A-D Critical Value	0.738				90% Percentile	127
				K-S Test Statistic	0.167				95% Percentile	143
				5% K-S Critical Value	0.258				99% Percentile	155.8
				Data appear Gamma Distributed at 5% Significance Level						
				Assuming Gamma Distribution					95% UTL with 90% Coverage	159
				90% Percentile	152				95% Percentile Bootstrap UTL with 90% Coverage	159
				95% Percentile	189.1				95% BCA Bootstrap UTL with 90% Coverage	159
				99% Percentile	272.4				95% UPL	159
									95% Chebyshev UPL	298.2
				95% WH Approx. Gamma UPL	204.8				Upper Threshold Limit Based upon IQR	231.6
				95% HW Approx. Gamma UPL	214.9					
				95% WH Approx. Gamma UTL with 90% Coverage	247.8					
				95% HW Approx. Gamma UTL with 90% Coverage	265.4					

Field Change Request No. 10 – Revised Project Action Limits (01 February 13)

Analyte	CAS No.	Project Action Limits (mg/kg)			
		Current[1]	Resident Soil[2]	2μ Background[3]	Recommended
Antimony (Sb)	7440-36-0	0.66	31	0.304	31
Copper (Cu)	7440-50-8	51	3,100	33.10	3,100
Lead (Pb)	7439-92-1	14	400	74.82	400
Zinc (Zn)	7440-66-6	680	23,000	147.94	23,000

[1] Based on the Risk-based SSL (or MCL-based SSL for lead) for Protection of Groundwater from the EPA Regional Screening Level (RSL) Summary Table dated June 2011.
[2] Based on the Resident Soil RSL from the EPA Regional Screening Level (RSL) Summary Table dated November 2012.
[3] Represents two times the arithmetic mean (μ) from background samples (ProUCL Version 4.1).