

Environment, Land & Water Department 6200 West Duval Mine Road PO Box 527 Green Valley, Arizona 85622-0527

August 1, 2013

Via Certified Mail # 7011 1150 0000 0283 9208 Return Receipt Requested

Ms. Danielle Taber
Project Manager
Voluntary Remediation Program
Arizona Department of Environmental Quality
1110 W. Washington St.
Phoenix, AZ 85007

Re: Response to Comments and Revised Report for Final Voluntary

Remediation Soil and Sediment Characterization Report

Freeport Sierrita Mine Green Valley, Arizona; Site Code: 100073-03

Dear Ms. Taber:

This letter provides Freeport-McMoRan Sierrita Inc. (Sierrita) responses to comments presented in Arizona Department Environmental Quality's (ADEQ) January 8, 2013 letter addressing Sierrita's Final Voluntary Remediation Soil and Sediment Characterization Report dated December 2012.

For ease of reference, ADEQ's comments have been restated in italics followed by Sierrita's response.

1. ADEQ Comment: In accordance with Arizona Revised Statute (A.R.S.) § 49-181, the VRP can issue a No Further Action (NFA) determination or a Conditional NFA determination. A Conditional NFA is issued when remediation levels have been achieved through the use of an institutional control, i.e. Declaration of Environmental Use Restriction (DEUR). DEURs are utilized when property owners elect to leave soil concentrations in place that exceed the respective residential standard. Therefore, ADEQ recommends that the soil data defined in the report be compared to the residential Soil Remediation Levels (RSRLs). It is important to identify all contaminant(s) of concern and their respective area(s), in the early stage of the remedial cleanup process, so a remedial plan can be developed that adequately addresses the environmental issues. This will help alleviate potential misunderstandings that could inhibit the project from moving forward in a timely and efficient manner.

Furthermore, Section 4.5 (Conclusions and Recommendations) identifies arsenic as the only contaminant of potential concern, because the concentration levels exceed the respective NRSRL. However, the data presented in the report suggests that soil concentrations for antimony, lead, copper, arsenic, molybdenum, and uranium exceed their respective RSRLs in a number of the subareas on the site. For example, the "Former Laydown Yard Area" has soil concentration levels that exceed the RSRL for copper [3100 milligrams per kilogram (mg/kg)] in 10 of the 17 samples and in 11 of the 17 samples for molybdenum (390 mg/kg). Areas where soil concentrations exceed an applicable RSRL will require further evaluation, which may include the use of a DEUR to obtain closure. If necessary, Table 4-1 will need to be revised to reflect changes to the recommendations column that may occur as a result of the residential standard comparison.



Sierrita's Response to Comment 1: FMI understands and acknowledges that a Conditional NFA may be issued by ADEQ and a DEUR may be required to obtain closure for the sites that are assessed and remediated to NRSRLs. In accordance with Arizona Administrative Code (A.A.C.) R18-7-208, a DEUR is required when a property owner elects to leave contamination on a property that exceeds the applicable residential standard for the property either through the use of the predetermined remediation standards (i.e., r-SRLs) or thru the use of site-specific remediation standards. Site-specific remediation standards will be developed based on a Baseline Human Health Risk Assessment (BHHRA) for soil at the three subareas at the site. Comparison, analysis and discussion of applicability of residential standards will be completed in the BHHRA.

2. **ADEQ Comment:** Please provide additional information or references for the rational in determining that the trivalent chromium SRLs should be utilized as the screening level for the site. In addition, if it is intended that both trivalent and hexavalent chromium will be included as contaminants of concern in the NFA, then adequate sampling data will need to be collected in all of the respective areas for the contaminant in order for ADEQ to issue an NFA determination.

Sierrita's Response to Comment 2: The soil and sediment characterization report (SSCR) does address the screening for hexavalent chromium and provides rationale for using the SRL for trivalent chromium. In Section 2.5 of the SSCR it states that "...selected soil samples that exceeded the residential (r)-SRL for hexavalent chromium of 30 mg/kg were also analyzed for hexavalent chromium..." In subsequent sections to SSCR the total chromium results were screened against the RSRL for hexavalent chromium. In majority of the samples where the total chromium concentration exceeded the RSRL for hexavalent chromium, these samples were analyzed for hexavalent chromium. The corresponding analytical results indicated that hexavalent chromium was not reported above detect limits in any of the samples analyzed. In addition, the SSCR provides justification and rationale for samples with total chromium concentrations that exceeded RSRL for hexavalent chromium but were not analyzed for hexavalent chromium, as well as rationale for use of the SRL for trivalent chromium. As an example, in the Sixth paragraph in Section 2.7.4.2, it states "Four samples contained chromium at concentrations ranging from 35 to 470 mg/kg exceeding the r-SRL screen for hexavalent chromium (30 mg/kg). These four samples were collected during the 2004 HGC investigation in which the chromium concentrations were significantly less than the r-SRL and nr-SRL for total chromium established at that time of 2,100 and 4,500 mg/kg, respectively. Therefore, none of these samples were analyzed for hexavalent chromium. However, when examining other subareas where hexavalent chromium analysis was performed on selected soil samples with total chromium ranging from 33 to 193 mg/kg (See Sections 2.13.4.2 and 2.14.4.2); hexavalent chromium was not detected in these samples above reporting limits. Therefore, considering that hexavalent chromium has not been used at the Sierrita site and is not likely to be stable in the geochemical environment of the surface and shallow subsurface soils, it is assumed that trivalent chromium is the most likely form of chromium present at the site. Given these considerations, the soil chromium results were compared to the trivalent chromium nr-SRL (1,000,000 mg/kg) in this report." Similar statements are also made in Sections 2.11.4.2, 2.12.4.2, 2.13.4.2, and 2.14.4.2 of the SSCR.

3. **ADEQ Comment**: ADEQ agrees that the data provided in the report identifies the potential contaminants of concerns; however, ADEQ is not convinced that all areas of the site have been adequately characterized. ADEQ will defer to a Sierrita selected risk assessor to review the applicable data and evaluate whether the quantity and quality of the data is adequate to conduct the proposed Human Health Risk Assessment (HHRA). However, it should be noted that the HHRA may not necessarily take into account all PCOC in all specific sub-areas. Therefore there may be areas that will require additional sampling in order to evaluate whether all sub-areas have been adequately characterized. Upon submittal to ADEQ, the HHRA will be reviewed by a third-party risk assessment expert and ADEQ will have final approval authority.



Sierrita's Response to Comment 3: Comment acknowledged. All data to be used in the BHHRA will be evaluated for usability and adequacy for risk assessment purposes. The steps proposed to complete that assessment are described in the *Voluntary Remediation Program Baseline Human Health Risk Assessment Work Plan* (ARCADIS, 2013). If the analysis identifies the need for additional data, a work plan to collect the data will be developed for ADEQ review and approval at that time. Please note that the SSCR report describes only the soil metal results; other PCOC soil and solid material data will be forthcoming in the VRP groundwater report, currently being drafted.

4. ADEQ Comment: It is unclear as to why Synthetic Precipitation Leaching Procedure (SPLP) samples were not collected for antimony as this was a contaminant, along with lead, that was identified in Section 4.3 as being above the minimum Groundwater Protection Level (GPL). SPLP samples were collected and analyzed for lead and an alternative GPL was calculated accordingly. In order to be consistent with the process that was conducted for lead it is recommended that SPLP samples be collected in order to calculate an alternative GPL for antimony.

Sierrita's Response to Comment 4: For lead, the calculated 95% UCL exceeded the GPL at one site (See Section 4.3 of the SSCR); therefore, conducting SPLP testing for lead and calculating an alternative GPL was appropriate. For antimony, the calculated 95% UCL was below the GPL therefore SPLP testing was not performed. As with direct exposure to soil, the 95% UCL represents a broader range of the concentrations that would likely leach to groundwater because leaching occurs over a generalized area, not at a single location within a site. For antimony, note that the only samples that exceeded the GPL were 3 samples collected during the 2004 investigation.

5. **ADEQ Comment:** In addition, please provide and include a table that illustrates how the alternative GPLs were calculated. This should include the "total metal" concentration, SPLP, R-value, etc. This information would be helpful for ADEQ to understand how these alternative GPL were derived.

Sierrita's Response to Comment 5: The alternate GPL calculation table for lead is attached to this response (see Attachment 1). In addition, per ADEQ's request in Comment 7, an electronic version of the calculation table will be provided by email.

6. **ADEQ Comment:** Please include the respective Pro UCL worksheet and the calculation sheet illustrating the generated statistical data. This information would be helpful for ADEQ to understand how the data was categorized and evaluated.

Sierrita's Response to Comment 6: The Pro UCL worksheets and calculation sheets are attached to this response (see Attachment 2). In addition, per ADEQ's request in Comment 7, an electronic version of the Pro UCL calculations will be provided by email.

7. **ADEQ Comment:** Please include an electronic copy of all reports that are submitted.

Sierrita's Response to Comment 7: Electronic copies will be submitted to ADEQ for all appropriate responses.



Report Cited:

ARCADIS. 2013. Voluntary Remediation Program Baseline Human Health Risk Assessment Work Plan. Freeport Sierrita Mine, Green Valley, Arizona; Site Code: 100073-03. February 1.

If you have any questions, please contact me at (520) 393.2252

Sincerely

Kanyembo Katapa Environmental Engineer

KK:ms 20130801_002

cc John Patricki, ADEQ
John Broderick, Sierrita
Lana Fretz, Sierrita
Ned Hall, Freeport-McMoRan Copper & Gold
Stuart Brown, Freeport-McMoRan Copper & Gold



Attachment 1

	Total Lead			Alternative GPLs
Sample ID	(mg/kg)	SPLP Lead (mg/L)	Ratio R	(mg/kg)
CS-JS-02-10-11	376	0.2	1880	27,532.60
C-JS-05-00-01	477	0.0005	954000	13,971,330.00
C-JS-05-01-03	3740	0.001	3740000	54,772,300.00
RA-JS-02-01-03	349	0.2	1745	25,555.53
EM-JS-02-01-03	576	0.2	2880	42,177.60
EM-JS-08-05-07	999	0.0005	1998000	29,260,710.00
EM-JS-08-10-12	303	0.0005	606000	8,874,870.00

Inorganic GPL Equation X = (292.9)RCw Cw = 0.05

Most Conservative Alternative GPL 25,556 mg/kg



Attachment 2

	A B C D E	T F	GHIJK	1
1	General UCL Statistics			L
2	User Selected Options			
3	From File P:\WRES\Freeport_Mc	:MoRan\240	096838_Sierrita\Soil VRP Review\ProUCL\ProUCL worksheet.wsf	
4	Full Precision OFF			
5	Confidence Coefficient 95%			
6	Number of Bootstrap Operations 2000			
7				
8				
9	CP-Antimony			
10				
11		Gene	ral Statistics	
12	Number of Valid Observation	s 79	Number of Distinct Observations	25
13	Number of Missing Value	s 55		
14				
15	Raw Statistics		Log-transformed Statistics	
16	Minimur	n 0.2	Minimum of Log Data	-1.609
17	Maximun	n 66	Maximum of Log Data	4.19
18	Mea	n 2.844	Mean of log Data	-0.0223
19	Media	n 1	SD of log Data	1.086
20		9.375		
21	Coefficient of Variation	n 3.296		
22	Skewness	s 5.925		
23				
24		Relevant	UCL Statistics	
25	Normal Distribution Test		Lognormal Distribution Test	
26	Lilliefors Test Statistic	AND 1811 111 111 111 111 111 111	Lilliefors Test Statistic	0.277
27	Lilliefors Critical Value	e 0.0997	Lilliefors Critical Value	0.0997
28	Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
29		7		
30	Assuming Normal Distribution		Assuming Lognormal Distribution	***
31	95% Student's-t UCI	_ 4.6	95% H-UCL	
32	95% UCLs (Adjusted for Skewness)	T	95% Chebyshev (MVUE) UCL	
33	95% Adjusted-CLT UCI		97.5% Chebyshev (MVUE) UCL	
34	95% Modified-t UCL	_ 4./1/	99% Chebyshev (MVUE) UCL	4.336
35	0.000			
36	Gamma Distribution Test	0.500	Data Distribution	
37	k star (bias corrected		Data do not follow a Discernable Distribution (0.05	
38	Theta Sta			
39	773 9739	r 89.71		
40	Approximate Chi Square Value (.05		Nonparametric Statistics	
41	Adjusted Level of Significance		95% CLT UCL	
42	Adjusted Chi Square Value	68.53	95% Jackknife UCL	
43	A 1	11.00	95% Standard Bootstrap UCL	
44	Anderson-Darling Test Statistic		95% Bootstrap-t UCL	
45	Anderson-Darling 5% Critical Value		95% Hall's Bootstrap UCL	
46	Kolmogorov-Smirnov Test Statistic		95% Percentile Bootstrap UCL	
47	Kolmogorov-Smirnov 5% Critical Value		95% BCA Bootstrap UCL	
48	Data not Gamma Distributed at 5% Significance Le	evel	95% Chebyshev(Mean, Sd) UCL	
49	Accoming Course District		97.5% Chebyshev(Mean, Sd) UCL S	
50	Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	3.34

	A B C D E	T F	GHIJK	
51	95% Approximate Gamma UCL		G H I I J K	<u> </u>
52	95% Adjusted Gamma UCL	3.723		
53				
54	Potential UCL to Use		Use 97.5% Chebyshev (Mean, Sd) UCL	9.431
55				
56				
57 C	CP-As			
58				
59		100000,00000000000000000000000000000000	al Statistics	
60	Number of Valid Observations		Number of Distinct Observations	71
61	Number of Missing Values	39		
62				
63	Raw Statistics		Log-transformed Statistics	
64	Minimum	2.0	Minimum of Log Data	
65	Maximum		Maximum of Log Data	
66		10.27	Mean of log Data	
67	Median		SD of log Data	1.127
68		21.15	0	
69	Coefficient of Variation			
70	Skewness	5.425		
71		D .		
72	No I Division of the second	Relevant	JCL Statistics	
73	Normal Distribution Test	0.000	Lognormal Distribution Test	
74	Lilliefors Test Statistic		Lilliefors Test Statistic	
75	Lilliefors Critical Value	0.0909	Lilliefors Critical Value	0.0909
76	Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
77	Assuming Normal Distribution		Assuming Lawrence I Bit All Little	
78	95% Student's-t UCL	13 97	Assuming Lognormal Distribution	
79	95% UCLs (Adjusted for Skewness)	15.67	95% H-UCL 95% Chebyshev (MVUE) UCL	
80	95% Adjusted-CLT UCL	15.13		
81	95% Modified-t UCL		97.5% Chebyshev (MVUE) UCL	
82	30% (Wodified Code	14.07	99% Chebyshev (MVUE) UCL	21.14
83	Gamma Distribution Test		Data Distribution	
84	k star (bias corrected)	0.74	Data do not follow a Discernable Distribution (0.05)	
85	Theta Star	21-11-11	Constitution a Discernable Distribution (0.05)	
86	nu star			
87	Approximate Chi Square Value (.05)		Nonparametric Statistics	
88	Adjusted Level of Significance		95% CLT UCL	13.8/
89	Adjusted Chi Square Value		95% Jackknife UCL	
90			95% Standard Bootstrap UCL	
91	Anderson-Darling Test Statistic	4.937	95% Bootstrap-t UCL	
93	Anderson-Darling 5% Critical Value		95% Hall's Bootstrap UCL	
93	Kolmogorov-Smirnov Test Statistic	2070 0 22 20 20 20 20 20 20 20 20 20 20 20	95% Percentile Bootstrap UCL	
95	Kolmogorov-Smirnov 5% Critical Value	zoremente es	95% BCA Bootstrap UCL	
96	Data not Gamma Distributed at 5% Significance Lev		95% Chebyshev(Mean, Sd) UCL	
90			97.5% Chebyshev(Mean, Sd) UCL 2	
98	Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL 3	
99	95% Approximate Gamma UCL	12.64	3,500,000	
00	95% Adjusted Gamma UCL			
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	A B C D E	l F	G H I J K	T L
101				
102	Potential UCL to Use		Use 97.5% Chebyshev (Mean, Sd) UCL	23.82
103				
104				
105 CP	-Cu			
106				
107			Statistics	
108	Number of Valid Observations		Number of Distinct Observations	92
109	Number of Missing Values	39		
110				
111	Raw Statistics		Log-transformed Statistics	
112	Minimum		Minimum of Log Data	
113	Maximum		Maximum of Log Data	
114		5548	Mean of log Data	Constitution of the second
115	Median		SD of log Data	1.388
116		15148		
117	Coefficient of Variation			
18	Skewness	4./31		
19		Deles		
20	News of Distribution Total	Relevant U	CL Statistics	
21	Normal Distribution Test	10.000	Lognormal Distribution Test	
22	Lilliefors Test Statistic		Lilliefors Test Statistic	
23	Lilliefors Critical Value	0.0909	Lilliefors Critical Value	0.0909
24	Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
25	Assuming Normal Distribution		A	
26	95% Student's-t UCL	0120	Assuming Lognormal Distribution	
27	95% UCLs (Adjusted for Skewness)	0130	95% H-UCL	
28	95% Adjusted-CLT UCL	9010	95% Chebyshev (MVUE) UCL	
29	95% Modified-t UCL	No. of the second second	97.5% Chebyshev (MVUE) UCL	
30	3378 Wodified-t OCL	0230	99% Chebyshev (MVUE) UCL	10651
31	Gamma Distribution Test		Data Distribution	
32	k star (bias corrected)	0.465	Data Distribution Data do not follow a Discernable Distribution (0.05	
33	Theta Star	The second second	Data do not follow a Discernable Distribution (0.05)
34	nu star	The second control of		
35	Approximate Chi Square Value (.05)		Nonparometria Statistica	
36	Adjusted Level of Significance		Nonparametric Statistics 95% CLT UCL	0104
37	Adjusted Chi Square Value		95% CLT UCL 95% Jackknife UCL	
38	, isjusted on oquate value		95% Standard Bootstrap UCL	
39	Anderson-Darling Test Statistic	9.996	95% Standard Bootstrap UCL	
40	Anderson-Darling 5% Critical Value		95% Hall's Bootstrap UCL	
11	Kolmogorov-Smirnov Test Statistic		95% Percentile Bootstrap UCL	
12	Kolmogorov-Smirnov 5% Critical Value		95% BCA Bootstrap UCL	
13	Data not Gamma Distributed at 5% Significance Lev		95% Chebyshev(Mean, Sd) UCL	
14	2.		97.5% Chebyshev(Mean, Sd) UCL	
15	Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL 2	
16	95% Approximate Gamma UCL	7243	99 % Chebysnev(Mean, 5d) UCL 2	21011
47	95% Adjusted Gamma UCL			
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49	Potential UCL to Use		1100 07 EW Obstacle (M. O. 2011)	15051
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51			•						
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53 CP-F	Pb								
54			200						
55		General	Statistics						
56	Number of Valid Observations	95			Number	of Distinct Observation	s 91		
57	Number of Missing Values	39							
58									
59	Raw Statistics			Log	g-transforr	ned Statistics			
60	Minimum	100000		Minimum of Log Da					
61	Maximum	129050500000		<u> </u>		Maximum of Log Dat			
52	200 Maria (2000)	68.23		2447		Mean of log Dat			
3	Median	D7 (2000)				SD of log Dat	a 1.469		
64		224.1							
55	Coefficient of Variation								
66	Skewness	6.106							
67									
8		Relevant U	CL Statistics			•			
9	Normal Distribution Test	0.000		Log	normal Dis	stribution Test	_		
0	Lilliefors Test Statistic	0.000				Lilliefors Test Statisti			
1	Lilliefors Critical Value	0.0909				Lilliefors Critical Value	0.0909		
2	Data not Normal at 5% Significance Level			Data not Log	normal at	5% Significance Level			
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74	Assuming Normal Distribution 95% Student's-t UCL	100.4		Assum	ing Logno	rmal Distribution	T		
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77	95% Modified-t UCL					Chebyshev (MVUE) UCI			
78	93% Woullieu-t OCL	100.0			99% (Chebyshev (MVUE) UCI	128.9		
9	Gamma Distribution Test				Data Dis	telle etter			
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2	nu star								
3	Approximate Chi Square Value (.05)	Access to the second		No	nnaramoti	ric Statistics			
4	Adjusted Level of Significance	150			nparamet	95% CLT UCL	106.1		
5	Adjusted Chi Square Value					95% Jackknife UCL	10 10 10 10 10 10 10 10 10 10 10 10 10 1		
6	e.jas.isa sin squais value				95%	Standard Bootstrap UCL	The Bases to		
7	Anderson-Darling Test Statistic	9.476			0070	95% Bootstrap-t UCL	1000 000		
8	Anderson-Darling 5% Critical Value				QF.	5% Hall's Bootstrap UCL			
9	Kolmogorov-Smirnov Test Statistic					ercentile Bootstrap UCL			
0	Kolmogorov-Smirnov 5% Critical Value					5% BCA Bootstrap UCL			
1	Data not Gamma Distributed at 5% Significance Le			72 19		ebyshev(Mean, Sd) UCL	y		
2						ebyshev(Mean, Sd) UCL			
3	Assuming Gamma Distribution					ebyshev(Mean, Sd) UCL			
1	95% Approximate Gamma UCL	90.5		7-70 (0000) 149-4	00.00116	Series (Modri, Od) OCL	207.1		
5	95% Adjusted Gamma UCL	SE 54-30-51-10		W					
6	33.3.1.3,2333.2.2.3.1114.3.3.2	000000000							
							1		
7	Potential UCL to Use			Use	7.5% Chel	oyshev (Mean, Sd) UCL	211 0		

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201	CP-Sb		G	H		J	K	L
202							<u> </u>	
203		Gene	eral Statistics					
204	Number of Valid Observations	s 79			Number	of Distinct C	bservation	s 22
205	Number of Missing Values	s 55		57 VIII				
206								
207	Raw Statistics			L	og-transforn	ned Statistic	5	
208	Minimum	0.3				Minimum	of Log Dat	a -1.204
209	Maximum	66				Maximum	of Log Dat	a 4.19
210	Mean	2.996				Mean	of log Dat	a 0.245
211	Median	1				SD	of log Dat	a 0.876
212	SD	9.337						
213	Coefficient of Variation	3.116						
214	Skewness	5.949						
215								
216		Relevan	t UCL Statistics				1-57	
217	Normal Distribution Test			Lo	gnormal Dis	tribution Tes	st	
218	Lilliefors Test Statistic	2 2 10 1 E				Lilliefors T	est Statistic	0.395
219	Lilliefors Critical Value	0.0997				Lilliefors Cr		0.0997
220	Data not Normal at 5% Significance Level			Data not Lo	ognormal at	5% Significa	nce Level	
221								
222	Assuming Normal Distribution			Assu	ming Lognor			
223	95% Student's-t UCL	4.745					5% H-UCL	
224	95% UCLs (Adjusted for Skewness)	I= 1=0				hebyshev (N	0.50	
225	95% Adjusted-CLT UCL 95% Modified-t UCL					hebyshev (N		
226	95% Modified-t OCL	4.862			99% C	hebyshev (N	IVUE) UCL	. 3.967
227	Gamma Distribution Test				D-1 D'			
228	k star (bias corrected)	0.60	Det	- d f-	Data Dist			
229	Theta Star		Dai		llow a Discer	nable Distril	oution (0.0	5)
230	nu star							
231	Approximate Chi Square Value (.05)				lonnarametri	o Statistica		
232	Adjusted Level of Significance				lonparametri		6 CLT UCL	14.704
233	Adjusted Chi Square Value						kknife UCL	
234	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	001.10			95% \$	tandard Boo		NO-CATOTICO
235	Anderson-Darling Test Statistic	18.3			33703	95% Boots		
236 237	Anderson-Darling 5% Critical Value			- 115	959	% Hall's Boot		
238	Kolmogorov-Smirnov Test Statistic					rcentile Boot		
239	Kolmogorov-Smirnov 5% Critical Value		+			% BCA Boot		
240	Data not Gamma Distributed at 5% Significance Lev	vel				yshev(Mear		
241						yshev(Mear		
242	Assuming Gamma Distribution					yshev(Mear	#14 - Otto Colo #11 - O Colo #14 - Hall	240000000000000000000000000000000000000
243	95% Approximate Gamma UCL	3.802			- 77			
244	95% Adjusted Gamma UCL	3.819						
245				****				
246	Potential UCL to Use			Us	se 95% Cheb	yshev (Mean	, Sd) UCL	7.575
247				<u> </u>				
248								
	EM-Sb							
250				10				

	A B C D E	F General S	G H I J K	L
251	Number of Valid Observations			
252	Number of Valid Observations Number of Missing Values	100	Number of Distinct Observations	13
253	Number of Missing Values	5 5		
254	Raw Statistics			
255		10.0	Log-transformed Statistics	
256	Minimum		Minimum of Log Data	
257	Maximum	1 1282	Maximum of Log Data	100
258		2.605	Mean of log Data	
59	Median	222	SD of log Data	1.06
60		10.67		
61	Coefficient of Variation	1 1 1 1 1 1 1		
62	Skewness	6.327		
63				
64		Relevant UCL	Statistics	
65	Normal Distribution Test		Lognormal Distribution Test	
36	Shapiro Wilk Test Statistic	0.211	Shapiro Wilk Test Statistic	0.833
67	Shapiro Wilk Critical Value	0.941	Shapiro Wilk Critical Value	0.941
38	Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
69				
70	Assuming Normal Distribution		Assuming Lognormal Distribution	
71	95% Student's-t UCL	5.411	95% H-UCL	1.999
72	95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	
73	95% Adjusted-CLT UCL	7.105	97.5% Chebyshev (MVUE) UCL	
	95% Modified-t UCL		99% Chebyshev (MVUE) UCL	
74	and the second s		oo // Cricbyshev (MVOE) OCE	0.001
75	Gamma Distribution Test		Data Distribution	
76	k star (bias corrected)	0.492	Data do not follow a Discernable Distribution (0.05	· · · · · · · · · · · · · · · · · · ·
77	Theta Star		Data do not follow a Discernable Distribution (0.05)
78	nu star			
79	Approximate Chi Square Value (.05)	***************************************	Non-constable Obstati	
30			Nonparametric Statistics	
31	Adjusted Level of Significance Adjusted Chi Square Value	DOSTER VISIONES	95% CLT UCL	
32	Adjusted Crit Square Value	20.38	95% Jackknife UCL	
3	Andrew Pod's T. 100 C.	0.507	95% Standard Bootstrap UCL	
4	Anderson-Darling Test Statistic	507AUS6396-554	95% Bootstrap-t UCL	
5	Anderson-Darling 5% Critical Value	100000000000000000000000000000000000000	95% Hall's Bootstrap UCL	
6	Kolmogorov-Smirnov Test Statistic		95% Percentile Bootstrap UCL	
7	Kolmogorov-Smirnov 5% Critical Value		95% BCA Bootstrap UCL	
8	Data not Gamma Distributed at 5% Significance Level	vel	95% Chebyshev(Mean, Sd) UCL	
9			97.5% Chebyshev(Mean, Sd) UCL	13.01
0	Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	19.18
1	95% Approximate Gamma UCL	3.923		
2	95% Adjusted Gamma UCL	3.983		
3				
4	Potential UCL to Use		Use 99% Chebyshev (Mean, Sd) UCL	19.18
5				
6 7 FEM-S	b			
4				
8		General Sta	atistics	
9				

	A	В	С	D	E	F	G	Н		1		J		K	L
301	1			Number of M	lissing Values	3									
302	2		D	Panalical											
303	3		Kaw S	Statistics	Minim	10.2			Log-tr	ansfo	rmed St				4.000
304					Minimum										-1.609
305			100-0		70.00 Co. 200	2.798					Max		of Log		20-20-00-00
306					Median								n of log	207	
307	1				555778884.0003894.0	10.63						SL	of log	Data	0.906
308	1			Coefficie	nt of Variation		-								
309				Coefficie	Skewness	Normal	_								
310					OKCWICOO	0.000									
311	1					Relevant I	JCL Statistics								
312			Normal Dis	tribution Te	st	- ioiorani			Lognor	mal D)istributi	on Te	et		
313	1				Test Statistic	0.204	Lognormal Distribution Test Shapiro Wilk Test Statistic 0.70							0 704	
314			S	Shapiro Wilk	Critical Value	0.941	Shapiro Wilk Critical Value 0.								
315	1	Data not	Normal at	5% Significa	nce Level	Total State of the Control of the Co		Data not	Logno		100				0.011
316 317															
318	230 0 00	As	suming No	rmal Distribu	ıtion	0.001		Ass	suming	Logn	ormal D	Distribu	ution		
319					udent's-t UCL	5.594		900 X0000			A STATE OF THE STA		95% H	-UCL	2.176
320		95%	UCLs (Adju	usted for Sk	ewness)					95%	Chebys	shev (l	MVUE)	UCL	2.649
321			X	95% Adjus	ted-CLT UCL	7.285				97.5%	Chebys	shev (I	MVUE)	UCL	3.122
322				95% M	odified-t UCL	5.868				99%	Chebys	hev (N	VVUE)	UCL	4.053
323								1994							
324			Gamma Dis				D	ata Di	istributio	on					
325				k star (bi	as corrected)	0.594	Data do not follow a Discernable Distribution (0.05))
326					Theta Star	4.706		S. 102							
327					nu star	48.75									
328		4000 00	Approxima	te Chi Squa	re Value (.05)	33.72	Nonparametric Statistics								
329			150		f Significance			95% CLT UCL 5.529							5.529
330			A	djusted Chi	Square Value	33.26							ckknife	200000000000000000000000000000000000000	
331										95%	Standa	rd Boo	otstrap	UCL	5.493
332					Test Statistic						95%	6 Boot	strap-t	UCL	34.82
333					Critical Value						95% Hal				
334					Test Statistic						Percenti				
335					Critical Value	Description of the com-					95% BC				
336		Data not Gamn	na Distribut	ed at 5% Sig	gnificance Le	vel					nebyshe				
337		Λ = -	numina Oz-	omo Distrib	tion	-	-				nebyshe	120	107107 AE		
338		Ass		nma Distribu		4.044			9	9% Ch	nebyshe	v(Mea	n, Sd)	UCL	19.32
339					Gamma UCL Gamma UCL		-								
340			95	no mujusted	Gairiilla UCL	4.1									
341			Potential	UCL to Use		-30			Heo Of	5% Ch	ebyshev	, /NA==	ם כא	LICI	10.04
342			i oteritial (COL IO USE					U36 30	70 CM	enysnev	(iviea	11, 50)	UCL	10.04
343															
344	FEM-As										_	<u> </u>			
343	, EN 713														
346						Genera	I Statistics								_
347			Numl	ber of Valid	Observations	10.00797.4550.17187	. 3.0.10100		N	lumber	of Disti	nct O	nserva	tions	39
348			5. 25.00		ssing Values	2000					or Disti			10110	,,,
349						5)									
350															

	A	В	С		E	F	G	Н	1	J	K	L
351			Raw St						Log-transfe	ormed Statistics	;	
352					nimum					Minimum o	of Log Data	0.0953
353				Max	cimum					Maximum o	of Log Data	4.615
354					Mean					Mean	of log Data	1.565
355				N	ledian					SD	of log Data	0.893
356						16.26						
357				Coefficient of Va								
358			_	Ske	wness	4.829						
359												
360						Relevant U	JCL Statistics					
361			Normal Distr						Lognormal	Distribution Tes		
362				napiro Wilk Test St						Shapiro Wilk Te		100-110-000
363				apiro Wilk Critical		0.943				Shapiro Wilk Cri		0.943
364		Data not	Normal at 5	% Significance Le	vel			Data not	Lognormal	at 5% Significar	nce Level	
365				15								
366		As	suming Norn	nal Distribution		10.71		As	suming Log	normal Distribut	20.124.250.5	
367		050/	1101 - (A.1	95% Student's-		12.71					5% H-UCL	
368		95%	_	ted for Skewness						6 Chebyshev (M		95397309 687
369				95% Adjusted-CLT	500000000000000000000000000000000000000					6 Chebyshev (M		- CC - C
370				95% Modified-	UCL	13.02			99%	6 Chebyshev (M	VUE) UCL	17.9
371			O Di-t									
372		Gamma Distribution Test k star (bias correcte								Distribution		
373		k star (bias correct Theta \$						ata do not	follow a Dis	cernable Distrib	ution (0.05	5)
374												
375			A		u star							
376				Chi Square Value					Nonparam	etric Statistics		
377				ed Level of Signific							CLT UCL	
378		E - 9-700	Aaj	usted Chi Square \	value	60.6					knife UCL	
379			A m days	on Davling Tool Ot		2744			95%	% Standard Boot		
380				on-Darling Test Sta						95% Bootst		
381				arling 5% Critical \v-Smirnov Test Sta						95% Hall's Boot		
382		Va	445	nirnov 5% Critical					95%	Percentile Boot		
383	Da			at 5% Significan					050/ 0	95% BCA Boots		
384	Da	ta not Ganin	ia Distributet	a at 5% Significant	Je Lev	ei				hebyshev(Mean	70.000	
385		٨٥٥	uming Comp	as Distribution						hebyshev(Mean		
386		ASS	- 20	na Distribution oroximate Gamma	LICI I	11 2		10.27	99% C	hebyshev(Mean	, Sa) UCL	33.21
387				Adjusted Gamma								
388			3370	, ajusteu dalliilla	JUL	1.1.41		170				
389			Potential U	Cl to Use					Llog OFO/ CI		0-1/110:	10.05
390			. oterniar O	JE 10 036					USE 95% CF	nebyshev (Mean	, sa) UCL	19.35
391	4 (6) 4)								J			
392	OD-As											
393												
394						General	Statistics					
395	Sec.		Numbe	r of Valid Observa	tione		Ciduolico		Ni mak -	or of Diatings Of	onuction T	20
396				mber of Missing Va					Numbe	er of Distinct Obs	ervations	20
397			1401	or or wildaing ve								
398			Raw Sta	tistics					l og-transfer	med Statistics		
399			010	5.000.000°, 014.000.	mum ().8			_og-uansior		Log Data	0.222
400				1411111	uiii	,				Minimum of	Log Data	-∪.∠∠3

Т	Α	В	С	D	I E	I F	T G T	н	I J K	1 1
401	Α			, D	Maximum		G		I J K Maximum of Log Data	a 2.361
402					Mear	3.36			Mean of log Data	a 1.006
403	10				Mediar	2.85			SD of log Data	a 0.664
404	-10				SE	2.345				
405				Coefficient	t of Variation	0.698				
406					Skewness	1.724				-
407										
408			-			Relevant l	JCL Statistics	300		
409			Normal Dist	ribution Test		56.00		Lo	gnormal Distribution Test	
410			S	hapiro Wilk 7	Test Statistic	0.847			Shapiro Wilk Test Statistic	0.985
411			S	hapiro Wilk C	Critical Value	0.905			Shapiro Wilk Critical Value	0.905
412		Data no	t Normal at 5	% Significar	nce Level			ata appear	Lognormal at 5% Significance Leve	el
113										
114	No	As	ssuming Nor	mal Distribut	ion			Assui	ming Lognormal Distribution	
115			1184-115	95% Stu	dent's-t UCL	4.267			95% H-UCL	4.74
116	V 45	95%	UCLs (Adju	sted for Ske	wness)				95% Chebyshev (MVUE) UCL	5.674
117	1038			95% Adjuste	ed-CLT UCL	4.438			97.5% Chebyshev (MVUE) UCL	6.673
118				95% Mo	dified-t UCL	4.3			99% Chebyshev (MVUE) UCL	8.636
119		2-17								1
120			Gamma Dis	tribution Test	t				Data Distribution	
21				k star (bia	s corrected)	2.23	Data	appear Gam	ma Distributed at 5% Significance	Level
22					Theta Star	1.507				
23			-		nu star	89.21				
24			Approximat	e Chi Square	Value (.05)	68.44		N	Ionparametric Statistics	
25			Adjus	ted Level of	Significance	0.038			95% CLT UCL	4.222
26			Ac	ljusted Chi S	quare Value	67			95% Jackknife UCL	4.267
127									95% Standard Bootstrap UCL	4.2
128			Anders	son-Darling T	est Statistic	0.226			95% Bootstrap-t UCL	4.618
29			Anderson-l	Darling 5% C	ritical Value	0.75			95% Hall's Bootstrap UCL	5.006
30			Kolmogoro	ov-Smirnov T	est Statistic	0.125			95% Percentile Bootstrap UCL	4.26
31		K	olmogorov-S	mirnov 5% C	ritical Value	0.195			95% BCA Bootstrap UCL	4.46
32	Data	appear Gar	mma Distribu	ited at 5% Si	ignificance l	_evel			95% Chebyshev(Mean, Sd) UCL	5.645
33									97.5% Chebyshev(Mean, Sd) UCL	6.634
34		Ass	suming Gam	ma Distribut	ion				99% Chebyshev(Mean, Sd) UCL	8.577
35			95% A _l	oproximate G	amma UCL	4.38		**		
36			959	% Adjusted G	iamma UCL	4.474				
37										
38			Potential L	ICL to Use				Į	Jse 95% Approximate Gamma UCL	4.38
39										
40										
	PS-As						*			
42										
43						Genera	Statistics			
44		Stress ethics ethi	Numb	er of Valid O	bservations	41			Number of Distinct Observations	33
45			N	umber of Mis	sing Values	3				
46	/85				100					
47			Raw St	atistics				Lo	g-transformed Statistics	**********
48	33				Minimum	1.2			Minimum of Log Data	0.182
49	Maximum 23					23			Maximum of Log Data	3.135
$\overline{}$					Mean	5.02			Mean of log Data	1 265

	A	\Box	В		С		D	E	\Box	F	G		Н		Ī	Ι	J		K		L
451					V.C			Media			200000							SD c	of log Da	ta 0.679	Э
452								S	D 4.3	308											
453						Со	efficient	t of Variatio													
454								Skewnes	ss 2.4	466											
455													19	2							
456									Re	elevant U	CL Statistics	3									
457				Nor	mal Dist		mit.o						L	ognor							
458			200- 1905- 2					Fest Statisti									1		st Statis		
459	10							Critical Valu	ie 0.9	941					S	Shap	iro Wi	lk Crit	ical Valu	ie 0.94	I
460			Data no	ot Nor	mal at 5	% Si	gnificar	nce Level				Data	appea	r Logn	ormal	l at !	5% Si	gnifica	nce Le	/el	
461								al time as												1 2112	
462			А	ssum	ing Norr								Ass	uming	Logn	orm	al Dis	tributi	on	0.00	
463						6755		dent's-t UC	L 6.1	153									% H-UC		
464			95%	% UCI	_s (Adju														/UE) UC		
465						0.195500.013834		ed-CLT UC		***************************************				9				95	/UE) UC		
466							95% Mc	dified-t UC	L 6.1	196					99%	Che	ebyshe	ev (M∖	/UE) UC	L 10.49)
467																			312		
468				Gam	ma Dist												oution				
469						k s	tar (bia	s corrected				Data	appea	r Logn	ormal	l at 5	5% Sig	gnifica	nce Lev	el	
470								Theta Sta		RE-0-0-000											
471								nu sta													
472				App				Value (.05	200000	30 S2500				Nonpa	arame	etric	Statis				
473								Significanc		0.000									CLT UC		
474					Ad	ljuste	d Chi S	quare Valu	e 135	5.9							95%	Jackk	knife UC	L 6.153	
475					7 19										95%	Sta	ndard	Boots	strap UC	L 6.075	
476					Anders	son-D	arling T	est Statisti	c 1.0	93			1811				95% E	Bootstr	rap-t UC	L 6.654	
477							-	ritical Valu							g	95%	Hall's	Boots	strap UC	L 6.827	
478				Ko	lmogoro	ov-Sn	nirnov T	est Statisti	c 0.1	154					95% I	Perc	entile	Boots	trap UC	L 6.236	
479								ritical Valu		4			2000			95%	BCA	Boots	trap UC	L 6.431	
480		Data	not Gam	ıma D	istribute	d at	5% Sig	nificance L	evel					9	5% Ch	neby	shev(Mean,	Sd) UC	L 7.953	
481	18										72.11.2 - 28.2 - 1			97.	5% Ch	neby	shev(Mean,	Sd) UC	L 9.222	
482			As	ssumi	ng Gam									99	9% Ch	neby	shev(Mean,	Sd) UC	L 11.71	
483								amma UC													
484					95%	% Adj	usted G	amma UC	L 6.1	18											
485																				2	
486				Po	tential U	JCL to	Use										U	se 95°	% H-UC	L 6.131	
487							N - 22 - 12 - 1														
488	200						112.00						ul m								
489	CPS-Pb							-02													
490																					
491										General S	Statistics										
492			44					bservation						N	umber	r of [Distino	t Obs	ervation	s 40	
493					Nt	umbe	r of Mis	sing Value	s 3												
494																					
495					Raw Sta	atistic	cs						L	.og-tra	nsforr						
496								Minimun											Log Dat		
497								Maximun		1045-1						Ν			Log Dat		- 1
498								100000000000000000000000000000000000000	n 190								Me	ean of	log Data	4.198	
499								Media	4	0110								SD of	log Data	1.22	
500								SE	580)											

	A B C D E	I F	G H I J K	T .
501	Coefficient of Variation		GHIJK	<u> </u>
502	Skewness	6.019		
503		-		
504		Relevant U	CL Statistics	
505	Normal Distribution Test		Lognormal Distribution Test	
506	Shapiro Wilk Test Statistic	0.289	Shapiro Wilk Test Statistic	0.962
507	Shapiro Wilk Critical Value	0.941	Shapiro Wilk Critical Value	
508	Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Leve	
509				
510	Assuming Normal Distribution		Assuming Lognormal Distribution	
511	95% Student's-t UCL	342.5	95% H-UCL	231.4
512	95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	
513	95% Adjusted-CLT UCL	430	97.5% Chebyshev (MVUE) UCL	
14	95% Modified-t UCL	356.7	99% Chebyshev (MVUE) UCL	1
15			, , , , , , , , , , , , , , , , , , , ,	102.1
16	Gamma Distribution Test		Data Distribution	
17	k star (bias corrected)	0.563	Data appear Lognormal at 5% Significance Leve	ı l
518	Theta Star		The second secon	
519	nu star			
520	Approximate Chi Square Value (.05)	31.6	Nonparametric Statistics	
521	Adjusted Level of Significance		95% CLT UCL	330
22	Adjusted Chi Square Value	100000000000000000000000000000000000000	95% Jackknife UCL	100000000000
23	10 to 2010 1000 1000 1000 1000 1000 1000 100	100000000000000000000000000000000000000	95% Standard Bootstrap UCL	100000000000000000000000000000000000000
	Anderson-Darling Test Statistic	3.381	95% Bootstrap-t UCL	100000000000000000000000000000000000000
24	Anderson-Darling 5% Critical Value		95% Hall's Bootstrap UCL	The second second
25	Kolmogorov-Smirnov Test Statistic		95% Percentile Bootstrap UCL	Control States
26	Kolmogorov-Smirnov 5% Critical Value	550000000000000000000000000000000000000	95% BCA Bootstrap UCL	100 100 100 100 100 100 100 100 100 100
27	Data not Gamma Distributed at 5% Significance Lev	500000	95% Chebyshev(Mean, Sd) UCL	
28 29	3		97.5% Chebyshev(Mean, Sd) UCL	
	Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	
30	95% Approximate Gamma UCL	277.7	33% Gliebyshev(Mearl, Su) GCL	1091
31	95% Adjusted Gamma UCL			
32	,			
33	Potential UCL to Use		Use 95% H-UCL	221.4
34			03e 93 % TF0CL	231.4
35				
36 RP-As	s-soil-sed			
57				
38 39		General S	tatistics	
10	Number of Valid Observations		Number of Distinct Observations	28
11	Number of Missing Values		- Tambel of District Observations	
12	Raw Statistics		Log-transformed Statistics	
13	Minimum	1	Minimum of Log Data	0
14	Maximum		Maximum of Log Data	
15	Mean 2		Mean of log Data	
10			SD of log Data	
	Median			1 411/
17	Median SD		OD of log Data	
46 47 48 49		25.96	OD OI log Data	

		A B C D E	F	G	H I J K	Т					
Normal Distribution Test	551										
Shapiro Wilk Test Statistic 0.892	552		Relevant L	JCL Statistics							
Data not Normal at 5% Significance Level Data not Lognormal at 5% Significance Level	553		1		Lognormal Distribution Test						
Data not Lognormal at 5% Significance Level	554	POTENTIAL STATE OF THE			Shapiro Wilk Test Statistic						
Assuming Normal Distribution	555		0.924			B. C.					
Assuming Normal Distribution Assuming Lognormal Distribution 95% Students UCL 34.24 95% Hulb 77.25 75.86 95% UCLs (Adjusted for Skewness) 95% Chebyshev (MVUE) UCL 78.41 77.25	556	Data not Normal at 5% Significance Level			Data not Lognormal at 5% Significance Level						
SSS Student's-LUCL 34.24 SSS HUCL 77.25	557										
95% UCLs (Adjusted for Skewness) 95% Chetyshrev (MVUF) UCL 35.1 97.5% Chebyshrev (MVUF) UCL 36.34 95% Adjusted-CLT UCL 35.1 97.5% Chebyshrev (MVUE) UCL 36.34 95% Chebyshrev (MVUE) UCL 36.34 95% Chebyshrev (MVUE) UCL 37.5 37	558				Assuming Lognormal Distribution						
	559		34.24		95% H-UCI	77.25					
Second S	560	95% UCLs (Adjusted for Skewness)			95% Chebyshev (MVUE) UCI	78.41					
	561	E 098 (100 (100 (100 (100 (100 (100 (100 (10	100000000000000000000000000000000000000		97.5% Chebyshev (MVUE) UCI	_ 98.34					
Gamma Distribution Test	562	95% Modified-t UCL	34.42		99% Chebyshev (MVUE) UCI	_ 137.5					
	563										
	64	Gamma Distribution Test			Data Distribution						
The table State		k star (bias corrected)	0.781	Data	appear Gamma Distributed at 5% Significance	Level					
		Theta Star	33.16								
Approximate Chi Square Value (.05) 28.55 Nonparametric Statistics 35.56 Adjusted Level of Significance 0.0404 95.45 CLT UCL 33.95		nu star	43.71								
Adjusted Level of Significance 0.0404 955% CLT UCL 33.95 33.4 35% Jackknife UCL 34.24		Approximate Chi Square Value (.05)	29.55		Nonparametric Statistics						
Section Sect						33.95					
Standard Bootstrap UCL 33.78					STEERING STOCKHOOLING CONTROL OF THE STOCKHOOLING CONTROL						
Anderson-Darling Test Statistic											
Anderson-Darling 5% Critical Value 0.78 95% Hall's Bootstrap UCL 35.07 Kolmogorov-Smirnov Test Statistic 0.0935 95% Percentile Bootstrap UCL 34.05 Kolmogorov-Smirnov 5% Critical Value 0.171 95% BCA Bootstrap UCL 34.88 Kolmogorov-Smirnov 5% Critical Value 0.171 95% BCA Bootstrap UCL 34.88 Kolmogorov-Smirnov 5% Critical Value 0.171 95% BCA Bootstrap UCL 34.88 For Data appear Gamma Distributed at 5% Significance Level 95% Chebyshev(Mean, Sd) UCL 47.27 For Assuming Gamma Distribution 99% Chebyshev(Mean, Sd) UCL 74.77 For 95% Approximate Gamma UCL 38.28 For 95% Approximate Gamma UCL 39.24 For Batter 1 95% Approximate Gamma UCL 39.24 For Batter 2 95% Approximate Gamma UCL 38.28 For Batter 3 95% Approximate Gamma UCL 39.24 For Batter 3 95% Approximate Gamma UCL 35.07 For Batter 3 95% Approximate Gamma UCL 35.07 For Batter 3 95% Approximate Gamma UCL 39.24 For Batter 3 95%		Anderson-Darling Test Statistic	0.313								
Kolmogorov-Smirnov Test Statistic 0.0935 95% Percentile Bootstrap UCL 34.05					200 - C - C - C - C - C - C - C - C - C -						
Kolmogorov-Smirnov 5% Critical Value 0.171 95% BCA Bootstrap UCL 34.88	Ver anne										
Data appear Gamma Distributed at 5% Significance Level 95% Chebyshev(Mean, Sd) UCL 47.27 97.5% Chebyshev(Mean, Sd) UCL 56.52 77.5% Chebyshev(Mean, Sd) UCL 56.52 77.5% Chebyshev(Mean, Sd) UCL 57.27 97.5% Chebyshev(Mean, Sd) UCL 74.7 79. 95% Approximate Gamma UCL 38.28 95% Adjusted Gamma UCL 39.24 98.80 95% Adjusted Gamma UCL 39.24 98.80 95% Approximate Gamma UCL 39.24 98.80 99% Chebyshev(Mean, Sd) UCL 74.7 74.											
Assuming Gamma Distribution 99% Chebyshev(Mean, Sd) UCL 74.77 74.77 95% Approximate Gamma UCL 38.28 95% Adjusted Gamma UCL 39.24 95% Approximate Gamma UCL 38.28 95% Approximate Gamma UCL		Data appear admind Distributed at 0 % Orginilodi loc									
95% Approximate Gamma UCL 38.28 95% Adjusted Gamma UCL 39.24		Assuming Gamma Distribution			The British Level Control of the Con						
95% Adjusted Gamma UCL 39.24 81	CONTROL OF		30 20		99% Chebysnev(Mean, Sd) UCL	/4./					
Potential UCL to Use		•									
Section Sect		93 % Adjusted Gaillia DCL	39.24								
Section Sect		Potential LICL to Line		-	11050/ 4						
RP-Cu-soil-sed RP-Cu-	82	Potential OCL to Use			Use 95% Approximate Gamma UCL	38.28					
RP-Cu-soil-sed RP-C											
Section Sect		Cu-soil-sed									
Number of Valid Observations 28	86										
88 Number of Valid Observations 28 Number of Distinct Observations 28 89 Number of Missing Values 1 Image: Contract of Contract	87		General	Statistics							
Number of Missing Values 1	88	Number of Valid Observations	28		Number of Distinct Observations	28					
	89	Number of Missing Values	1								
91 Raw Statistics Log-transformed Statistics 92 Minimum of Log Data 4.127 93 Maximum of Log Data 11.39 94 Mean of log Data 7.884 95 Median 4195 SD of log Data 1.917 96 SD 17359 Toefficient of Variation 1.824 Toefficient of Variation 1.824 <t< td=""><td>90</td><td></td><td></td><td>1</td><td></td><td></td></t<>	90			1							
Minimum 62 Minimum of Log Data 4.127 93 Maximum 88000 Maximum of Log Data 11.39 94 Mean of log Data 7.884 95 Median 4195 SD of log Data 1.917 96 SD 17359 Toefficient of Variation 1.824 Toefficient of Variation 1.824 Toefficient of Variation 1.824 Toefficient of Variation Toe		Raw Statistics			Log-transformed Statistics						
93 Maximum 88000 Maximum of Log Data 11.39 94 Mean of log Data 7.884 95 Median 4195 SD of log Data 1.917 96 SD 17359 Toefficient of Variation 1.824 Toefficient of Variation 1.824 Toefficient of Variation 1.824 Toefficient of Variation Toefficient of Variation 1.824	***	Minimum	62		Minimum of Log Data	4.127					
Mean 9517 Mean of log Data 7.884 95 Median 4195 SD of log Data 1.917 96 SD 17359 Toefficient of Variation 1.824 Toefficient of Variation 1.824 Toefficient of Variation Toefficient of V		Maximum	88000								
Median 4195 SD of log Data 1.917		Mean	9517								
SD 17359		Median	4195								
Coefficient of Variation 1.824 Skewness 3.748 Palevent I/OL Statistics					55 5.15g Bala	,,					
Skewness 3.748 Skewness 3.748											
Polovent LICL Statistics											
Polovent IICI Ctatistics		Chevilloss									
	99		Relevant III	CI Statistics							

	A B C D E	F	G H I J K L							
601	Normal Distribution Test		Lognormal Distribution Test							
602	Shapiro Wilk Test Statistic		Shapiro Wilk Test Statistic 0.936							
603	Shapiro Wilk Critical Value	0.924	Shapiro Wilk Critical Value 0.924							
604	Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level							
605										
606	Assuming Normal Distribution	,	Assuming Lognormal Distribution							
607	95% Student's-t UCL	15105	95% H-UCL 66766							
608	95% UCLs (Adjusted for Skewness)	,	95% Chebyshev (MVUE) UCL 43783							
609	95% Adjusted-CLT UCL		97.5% Chebyshev (MVUE) UCL 56577							
610	95% Modified-t UCL	15492	99% Chebyshev (MVUE) UCL 81707							
611										
612	Gamma Distribution Test		Data Distribution							
613	k star (bias corrected)		Data appear Gamma Distributed at 5% Significance Level							
614	Theta Star									
615	nu star									
616	Approximate Chi Square Value (.05)		Nonparametric Statistics							
617	Adjusted Level of Significance		95% CLT UCL 14913							
618	Adjusted Chi Square Value	15.04	95% Jackknife UCL 15105							
619			95% Standard Bootstrap UCL 14873							
620	Anderson-Darling Test Statistic		95% Bootstrap-t UCL 22637							
621	Anderson-Darling 5% Critical Value		95% Hall's Bootstrap UCL 34530							
622	Kolmogorov-Smirnov Test Statistic		95% Percentile Bootstrap UCL 15166							
623	Kolmogorov-Smirnov 5% Critical Value		95% BCA Bootstrap UCL 18151							
624	Data appear Gamma Distributed at 5% Significance L	.evel	95% Chebyshev(Mean, Sd) UCL 23817							
625	According October Distribution		97.5% Chebyshev(Mean, Sd) UCL 30004							
626	Assuming Gamma Distribution	10047	99% Chebyshev(Mean, Sd) UCL 42158							
627	95% Approximate Gamma UCL									
628	95% Adjusted Gamma UCL	16589								
629	Potential UCL to Use									
630	Foteritial OCL to USE		Use 95% Adjusted Gamma UCL 16589							
631										
632	RP-Pb-soil-sed	-								
033										
634		Gene	al Statistics							
635	Number of Valid Observations		Number of Distinct Observations 27							
636	Number of Missing Values		Number of Distinct Observations 27							
637	Training of Miceling Values	<u>.</u>								
638	Raw Statistics		Log-transformed Statistics							
639	Minimum	2 81	Minimum of Log Data 1.033							
640	Maximum :		Maximum of Log Data 1.033							
641	Mean		Mean of log Data 4.03							
642	Median									
643		86.04	SD of log Data 1.291							
644	Coefficient of Variation									
645	Skewness									
646	Sicovilicas									
647	1	Relevant	UCL Statistics							
648	Normal Distribution Test		Lognormal Distribution Test							
649	Shapiro Wilk Test Statistic	0.841	Shapiro Wilk Test Statistic 0.878							
650	Chapito Wilk Test etalistic	U.U.T.1	Shapho wilk rest Statistic 0.878							

	A B C D E	F	G	нТ	I J K	Т т				
651	Shapiro Wilk Critical Value	0.924			Shapiro Wilk Critical Valu	e 0.924				
652	Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level							
653										
654	Assuming Normal Distribution			Assuming Lognormal Distribution						
655	95% Student's-t UCL	123.7			95% H-UC	L 262				
656	95% UCLs (Adjusted for Skewness)	-	199		95% Chebyshev (MVUE) UC	L 281.5				
657	95% Adjusted-CLT UCL	128.1			97.5% Chebyshev (MVUE) UC	L 350				
658	95% Modified-t UCL	124.6			99% Chebyshev (MVUE) UC	L 484.6				
659				(8.5-30)						
660	Gamma Distribution Test			**	Data Distribution					
661	k star (bias corrected)	0.98	Data	appear Gamma	a Distributed at 5% Significance	Level				
662	Theta Star	98								
663	nu star	54.88								
664	Approximate Chi Square Value (.05)	38.85		Nor	parametric Statistics					
665	Adjusted Level of Significance	0.0404		22.30	95% CLT UC	122.8				
666	Adjusted Chi Square Value	38.02			95% Jackknife UCI	123.7				
667					95% Standard Bootstrap UCI	122.4				
668	Anderson-Darling Test Statistic	0.542			95% Bootstrap-t UCI	131.7				
669	Anderson-Darling 5% Critical Value	0.772			95% Hall's Bootstrap UCI	140.7				
670	Kolmogorov-Smirnov Test Statistic	0.153			95% Percentile Bootstrap UCL	122.8				
671	Kolmogorov-Smirnov 5% Critical Value	0.17			95% BCA Bootstrap UCL	131.5				
672	Data appear Gamma Distributed at 5% Significance L	_evel			95% Chebyshev(Mean, Sd) UCL	166.9				
673					7.5% Chebyshev(Mean, Sd) UCL	5 (100000000000				
674	Assuming Gamma Distribution				99% Chebyshev(Mean, Sd) UCL					
675	95% Approximate Gamma UCL	135.6								
676	95% Adjusted Gamma UCL	138.6								
677										
678	Potential UCL to Use			Use	e 95% Approximate Gamma UCL	135.6				
679										
680										
	DC-As-soil									
682										
683		Genera	al Statistics							
684	Number of Valid Observations	16			Number of Distinct Observations	16				
85	Number of Missing Values	2								
686										
387	Raw Statistics		1	Log-t	ransformed Statistics					
388	Minimum	3.4		00.00 3	Minimum of Log Data	1.224				
389	Maximum	64.8			Maximum of Log Data					
390	Mean	13.69		1300	Mean of log Data					
691	Median	10.5		· · · · · · · · · · · · · · · · · · ·	SD of log Data					
592		14.15				3.0.0				
	Coefficient of Variation									
393	Skewness									
94				_						
95		Relevant I	JCL Statistics							
96	Normal Distribution Test		J_ 544104103	Loans	ormal Distribution Test					
97	Shapiro Wilk Test Statistic	0.532		Logric	Shapiro Wilk Test Statistic	0.001				
98	Shapiro Wilk Critical Value				Dec and the district of the Committee of					
699	Data not Normal at 5% Significance Level		D.	ata annoer I co	Shapiro Wilk Critical Value	escoules time esco				
700	Data not Normal at 576 Significance Level		Da	ara abbeat rog	normal at 5% Significance Level					

	A	T - F		1					
701	A B C D E	F	G	Н			J	K	L
702	Assuming Normal Distribution	Assuming Lognormal Distribution							
703	95% Student's-t UCL	95% H-UCL 18.97							
704	95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL 22.47							
705	95% Adjusted-CLT UCL							CL 26.59	
706	95% Modified-t UCL	20.41			99	% Cheb	yshev (N	IVUE) U	CL 34.68
707									
708	Gamma Distribution Test				Data	Distribu	ution		
709	k star (bias corrected)	1.806		ata appear	Lognorn	nal at 59	% Signific	ance Le	vel
710	Theta Star	7.584							
711	nu star	57.78							
712	Approximate Chi Square Value (.05)	41.31		N	lonpara	metric S	tatistics		
713	Adjusted Level of Significance	0.0335			Wi Collaboration		95%	6 CLT U	CL 19.51
714	Adjusted Chi Square Value	39.72					95% Jacl	kknife U	CL 19.9
715					95	5% Stan	dard Boo	tstrap U	CL 19.33
716	Anderson-Darling Test Statistic	1.107					5% Boots	200 1000 1000	19 AND 1
717	Anderson-Darling 5% Critical Value	0.749					Hall's Boo		
718	Kolmogorov-Smirnov Test Statistic	0.257			95		entile Boo		100000
719	Kolmogorov-Smirnov 5% Critical Value	0.218					BCA Boo		5000 N 14000000
720	Data not Gamma Distributed at 5% Significance Le	vel			95%		hev(Mear	100	
721						1911	hev(Mear		2007000
722	Assuming Gamma Distribution						hev(Mear		
723	95% Approximate Gamma UCL	19.16					· ·		
724	95% Adjusted Gamma UCL	19.92		712 - 12412 - 21					
725									
726	Potential UCL to Use						Use 95	 5% H-U(CL 18.97
727									
728									
	-Pb-soil					100			
730									
731	The second secon	General	Statistics						
732	Number of Valid Observations	16			Numb	per of Di	stinct Ob:	servation	ns 16
733	Number of Missing Values	2							
734	Marian								
735	Raw Statistics		-11	Lo	g-transfe	ormed S	tatistics		
736	Minimum	33.5				M	inimum of	Log Da	ta 3.512
737	Maximum	999				Ma	ximum of	Log Da	a 6.907
738	Mean	207.6	7.5.			***************************************	Mean	of log Dat	a 4.925
739	Median	145.5						of log Dat	
740	SD	247.6					gr 6650435455		
741	Coefficient of Variation	1.193							
742	Skewness	2.642							
743					-//				
744		Relevant UC	CL Statistics						
745	Normal Distribution Test			Log	normal l	Distribut	tion Test		
746	Shapiro Wilk Test Statistic	0.63			100		Wilk Tes	t Statist	c 0.941
747	Shapiro Wilk Critical Value	0.887					Wilk Crit		NO. 10770501 BUSIN
748	Data not Normal at 5% Significance Level		D	ata appear L					25. E-25.000-20.00
749							- 3		
	Assuming Normal Distribution			Assun	ning Loa	normal I	Distributio	on	1
750	en consequent and the 💟 insperiment and the time and time and the tim				g0g				

	Α	В	С	D	TE	:	F	G	Г н Т						
751	A	В			udent's-t			G		95% H-UCL 348.7					
752		95% UCLs (Adjusted for Skewness)							95% Chebyshev (MVUE) UCL 39						
753				95% Adjus	sted-CLT	UCL	353.2		97.5% Chebyshev (MVUE) UCL 475.8						
754				95% N	1odified-t	UCL	323	99% Chebyshev (MVUE) UCL 643.1							
755															
756			Gamma Dist	tribution Te	st				380	Data Distribution					
757		k star (bias corrected) 1.						Data appear Lognormal at 5% Significance							
758					Theta	Star	181								
759			1000		nı	u star	36.71								
760			Approximat	e Chi Squa	re Value	(.05)	23.84		1	Nonparametric Statistics					
761			Adjus	ted Level o	f Signific	ance	0.0335			95% CLT UCL 309.5					
762			Ad	ljusted Chi	Square \	/alue	22.66			95% Jackknife UCL 316.2					
763										95% Standard Bootstrap UCL 306.8					
64			Anders	son-Darling	Test Sta	atistic	0.981			95% Bootstrap-t UCL 524.9					
65			Anderson-I	Darling 5%	Critical \	/alue	0.757			95% Hall's Bootstrap UCL 761.3					
			Kolmogoro	ov-Smirnov	Test Sta	tistic	0.257		<u></u>	95% Percentile Bootstrap UCL 320					
66		Ko	olmogorov-S							95% BCA Bootstrap UCL 366.2					
67	Da									95% Chebyshev(Mean, Sd) UCL 477.5					
68		Data not Gamma Distributed at 5% Significance Level								97.5% Chebyshev(Mean, Sd) UCL 594.3					
69		Ass	suming Gam	ma Distribi	ution					99% Chebyshev(Mean, Sd) UCL 823.6					
70		Assuming Gamma Distribution 95% Approximate Gamma UCL 31								33 % Chebyshev(Mean, 30) OCL 823.0					
71		5180		% Adjusted											
72				- rajustea	damma	OOL									
73	The state of the s		Potential U							11 050/ 111101 040 7					
774	W		1 Otorniar o	OL 10 030		100	_			Use 95% H-UCL 348.7					
777 L	OC-Mo-soil					1.									
79							General	Statistics							
80			Numb	er of Valid	Observa	tions	16		1.10	Number of Distinct Observations 16					
81			Νι	umber of M	issing Va	lues	2								
82				4-10											
83			Raw Sta	atistics					Lo	og-transformed Statistics					
84		-			Mini	mum	8		500	Minimum of Log Data 2.079					
85					Maxii	mum	6830			Maximum of Log Data 8.829					
86					٨	lean :	2106			Mean of log Data 6.709					
87				222	Me	dian	740.5			SD of log Data 1.714					
88						SD :	2597								
89		Test 4007 F	7.00	Coefficier	t of Varia	ation	1.233		175						
90					Skewi	ness	1.166								
91	MINT		*	***											
92						F	Relevant UC	CL Statistics							
93		١	Normal Distr	ibution Tes	it .				Lo	gnormal Distribution Test					
94			Sh	apiro Wilk	Test Sta	tistic	0.709			Shapiro Wilk Test Statistic 0.865					
95			Sh	apiro Wilk (Critical V	alue ().887			Shapiro Wilk Critical Value 0.887					
96		Data not I	Normal at 5%	% Significa	nce Leve	el			Data not Lo	ognormal at 5% Significance Level					
97									1000	0					
98		Ass	uming Norm	al Distribu	tion				Assur	ming Lognormal Distribution					
98		2 A 1 A 1 A 1 A 1 A 1 A 1 A 1 A 1 A 1 A		95% Stu	Patrici Managar	UCL	3244		95% H-UCL 2031						
00		95% l	JCLs (Adjus							95% Chebyshev (MVUE) UCL 9398					
		SECTION OF	,,							22 /0 CHEDYSHEV (MIVOL) OCE 3380					

	Α	В	С	D	E	F	G	Ιн	T	1	T J	K	T	
801				95% Adjus	ted-CLT UCL	3376	97.5% Chebyshev (MVUE) UCL 1218							
802			3276	99% Chebyshev (MVUE) UCL 17658										
803												Will		
804	Gamma Distribution Test						Data Distribution							
805	V		0.568	Data F	ollow App	r. Gamn	na Dist	ribution at 5	5% Significan	ce Level				
806					Theta Star	3711						30000	200 2000000	
807					nu star	18.17								
808			Approximat	e Chi Squar	e Value (.05)	9.511			Nonp	arame	tric Statistic	cs		
809			Adjus	sted Level of	Significance	0.0335					9	5% CLT UCL	3174	
810			Ac	8.804	95% Jackknife UCL 3244									
811				95% Standard Bootstrap UCL 3162										
812			Anders	0.838	95% Bootstrap-t UCL 3708						3708			
813			Anderson-l	Darling 5% (Critical Value	0.783		12.		g	5% Hall's B	ootstrap UCL	2975	
814			Kolmogoro	ov-Smirnov	Test Statistic	0.195				95% F	Percentile B	ootstrap UCL	3209	
815		Ko	olmogorov-S	mirnov 5% (Critical Value	0.225					95% BCA B	ootstrap UCL	3269	
816	Data fo	llow Appr. G	amma Distri	bution at 5%	6 Significand	e Level			9	5% Ch	ebyshev(Me	ean, Sd) UCL	4936	
817									97.	5% Ch	ebyshev(Me	ean, Sd) UCL	6160	
818		Ass	suming Gam	ma Distribu	tion				9	9% Ch	ebyshev(Me	ean, Sd) UCL	8565	
819			95% Ap	oproximate (Gamma UCL	4023								
820			959	% Adjusted 0	Gamma UCL	4346								
821														
822	35		Potential L	ICL to Use					Use	95% A	proximate	Gamma UCL	4023	
823														