RTeX = Real-Time Excel for XRF (spreadsheet) form for use with XRF instruments capable of reporting & nd error as 1 SD

sheet PW = XRF

When the XRF result and instrument error (as 1 SD) are entered, the spreadsheet calculates the mean, 2-sided and 1-sided Student's t LCLs and UCLs (for data with a normal distribution) and 1-sided Chebyshev LCLs and UCLs (for non-normal data).
Note: LCLs = lower confidence limits; UCLs = upper confidence limits. The spreadsheet partitions data error between analytical (XRF instrument precision) and sampling error (data variability due to matrix heterogeneity within the sample/bag).
LOD = sample-specific limit of detection

This sheet records XRF concentration results for DU bags & for subsamples for comparability analysis.

Project: Wilcox Oil Site Pb Delineation

Property ID: **LSA**

Instrument: TIIB Niton GOLDD Ultra (S/N 92959)

Run time applies to the Main filter (only filter being run)

particle size drop-down list

Bag Lots d-d list	bulk
none	<10-mesh
WM A6070C5	<100-mesh
PO 321861	

Note 1st and 2nd sieving results below

(0-6) Pb mean	UCL	%RSD	(6-24) mean	UCL	%RSD	(*1st sieve)
212.1	222.7	6.1	2862.5	3063.2	8.5	(*1st sieve)

(6-24) mean	UCL	%RSD	(*2nd sieve)
2736.9	2658.0	2.4	(*2nd sieve)

DU or Bag ID: LSA SUT 11,2 (0-6) **Element:** **Pb**

Operator: DMC Clerical:

Analysis Date: 27-Oct-2017 Read Bag lot = WM A6070C5

Particle Fraction Being Read: bulk -mesh (click in cell for drop-down)

Replicate Bag Readings	Time	Reading No.	Run Time (sec)	Instrument Result (ppm)	Instrument Error (as 1 Std Dev)	Note?
Replicate reading 1	1535	132		214.9	7.40	
2	1535	133		217.3	7.40	
3	1536	134		218.6	7.40	
4	1536	135		189.4	7.00	
5 (optional)	1538	136		226.4	7.50	
6 (optional)	1538	137		206.1	7.20	
7 (optional)						
8 (optional)						
9 (optional)						
10 (optional)						
11 (optional)						
12 (optional)						
			Mean	212.1	LOD =	21.96
			SD	12.91	**Ttl %RSD**	6.08
			n =	6		
		ProUCL distribution =		gamma		
	2-sided	Bag 95% t-LCL =		198.6		
	2-sided	Bag 95% t-UCL =		225.7		
	Bag 95% adj gamma UCL =			80.1		
	1-sided	Bag 95% t-UCL =		222.7		
	1-sided Bag 95% Chebyshev LCL =			203.1		
	1-sided Bag 95% Chebyshev UCL =			235.1		
subsampling error =		5.01	instrument error =		3.45	as %RSD

Duplicate Bag Analysis Run by: Run date:

Replicate Bag Readings	Time	Reading No.	Run Time (sec)	Instrument Result (ppm)	Instrument Error (as 1 Std Dev)	Note?
For duplicate sample analysis (repeat analysis of same bag)						
Replicate reading 1						
2						
3						
4						
5 (optional)						
6 (optional)						
7 (optional)						
8 (optional)						
9 (optional)						
10 (optional)						
			Mean	NA	LOD =	#DIV/0!
Hypothesis Test for			**SD**	NA	**Ttl %RSD**	#VALUE!
Duplicate Agreement			n =	0		
T-test p-value =		ProUCL distribution =				
#DIV/0!	er bag limit	Mean - 2 SD =		#VALUE!		
#DIV/0!	er bag limit	Mean + 2 SD =		#VALUE!		
1-sided		Bag 95% t-LCL =		#VALUE!		
1-sided		Bag 95% t-UCL =		#VALUE!		
1-sided Bag 95% Chebyshev LCL =				#VALUE!		
1-sided Bag 95% Chebyshev UCL =				#VALUE!		
subsampling error =		#VALUE!	instrument error =		#DIV/0!	as %RSD

Dup or Trip Rdg Set 1 of 1	Time	Reading No.	Run Time (sec)	Instrument Result (ppm)	Instrument Error (as 1 Std Dev)	Note?
Replicate reading 1						
2						
3						
4						
5 (optional)						
6 (optional)						
7 (optional)						
8 (optional)						
9 (optional)						
10 (optional)						
			Mean	NA	LOD =	#DIV/0!
			SD	NA	**Ttl %RSD**	#VALUE!
			n =	0		
		ProUCL distribution =				
	2-sided	95% t-LCL =		#VALUE!		
	2-sided	ƒ5% t-UCL =		#VALUE!		
	1-sided	95% t-LCL =		#VALUE!		
	1-sided	ƒ5% t-UCL =		#VALUE!		
	1-sided 95% Chebyshev LCL =			#VALUE!		
	1-sided 95% Chebyshev UCL =			#VALUE!		
subsampling error =		#VALUE!	instrument error =		#DIV/0!	as %RSD

Replicate Bag Readings	Time	Reading No.	Run Time (sec)	Instrument Result (ppm)	Instrument Error (as 1 Std Dev)	Note?
Replicate reading 1						
2						
3						
4						
5 (optional)						
6 (optional)						
7 (optional)						
8 (optional)						
9 (optional)						
10 (optional)						
			Mean	NA	LOD =	#DIV/0!
			SD	NA	**Ttl %RSD**	#VALUE!
			n =	0		
		ProUCL distribution =				
	2-sided	Bag 95% t-LCL =		#VALUE!		
	2-sided	Bag 95% t-UCL =		#VALUE!		
	1-sided	Bag 95% t-LCL =		#VALUE!		
	1-sided	Bag 95% t-UCL =		#VALUE!		
	1-sided Bag 95% Chebyshev LCL =			#VALUE!		
	1-sided Bag 95% Chebyshev UCL =			#VALUE!		
subsampling error =		#VALUE!	instrument error =		#DIV/0!	as %RSD

DU or Bag ID: LSA SUT 11,2 (6-24) **Element:** **Pb**

Operator: DMC Clerical: ***$ieve1**

Analysis Date: 6-Nov-2017 Read Bag lot = PO 321861

Particle Fraction Being Read: <10-mesh -mesh (click in cell for drop-down)

Replicate Bag Readings	Time	Reading No.	Run Time (sec)	Instrument Result (ppm)	Instrument Error (as 1 Std Dev)	Note?
Replicate reading 1	900	638	15	3102.6	29.08	
2	901	639	15	2695.5	26.89	
3	902	640	15	2777.0	27.13	
4	903	641	15	3230.7	29.31	
5 (optional)	904	642	15	2629.7	26.47	
6 (optional)	904	643	15	2739.7	27.34	
7 (optional)						
8 (optional)						
9 (optional)						
10 (optional)						
11 (optional)						
12 (optional)						
			Mean	2862.5	LOD =	83.17
			SD	243.98	**Ttl %RSD**	8.52
			n =	6		
		ProUCL distribution =				
	-2SD Lower bag limit		Mean - 2 SD =	2374.6		
	+2 SD Upper bag limit		Mean + 2 SD =	3350.5		
	1-sided	Bag 95% t-LCL =		2691.8		
	1-sided	Bag 95% t-UCL =		3063.2		
	1-sided Bag 95% Chebyshev LCL =			2426.4		
	1-sided Bag 95% Chebyshev UCL =			3298.7		
subsampling error =		8.47	instrument error =		0.97	as %RSD

Duplicate Bag Analysis ***$ieve2**

Replicate Bag Readings	Time	Reading No.	Run Time (sec)	Instrument Result (ppm)	Instrument Error (as 1 Std Dev)	Note?
For duplicate sample analysis (repeat analysis of same bag)						
Replicate reading 1	0905	644	15	2684.41	26.41	
2	0905	645	15	2794.61	27.09	
3	0906	646	15	2673.6	26.37	
4	0906	647	15	2794.97	27.71	
5 (optional)						
6 (optional)						
7 (optional)						
8 (optional)						
9 (optional)						
10 (optional)						
			Mean	2736.9	LOD =	80.70
Hypothesis Test for			**SD**	67.01	**Ttl %RSD**	2.4
Duplicate Agreement			n =	4		
T-test p-value =		ProUCL distribution =				
0.2765	er bag limit	Mean - 2 SD =		2602.9		
Dups DO agree	er bag limit	Mean + 2 SD =		2870.9		
1-sided		Bag 95% t-LCL =		2658.0		
1-sided		Bag 95% t-UCL =		2815.7		
1-sided Bag 95% Chebyshev LCL =				2590.8		
1-sided Bag 95% Chebyshev UCL =				2882.9		
subsampling error =		2.24	instrument error =		0.98	as %RSD

Dup or Trip Rdg Set 1 of 1	Time	Reading No.	Run Time (sec)	Instrument Result (ppm)	Instrument Error (as 1 Std Dev)	Note?
Replicate reading 1						
2						
3						
4						
5 (optional)						
6 (optional)						
7 (optional)						
8 (optional)						
9 (optional)						
10 (optional)						
			Mean	NA	LOD =	#DIV/0!
			SD	NA	**Ttl %RSD**	#VALUE!
			n =	0		
		ProUCL distribution =				
	2-sided	95% t-LCL =		#VALUE!		
	2-sided	ƒ5% t-UCL =		#VALUE!		
	1-sided	95% t-LCL =		#VALUE!		
	1-sided	ƒ5% t-UCL =		#VALUE!		
	1-sided 95% Chebyshev LCL =			#VALUE!		
	1-sided 95% Chebyshev UCL =			#VALUE!		
subsampling error =		#VALUE!	instrument error =		#DIV/0!	as %RSD

Replicate Bag Readings	Time	Reading No.	Run Time (sec)	Instrument Result (ppm)	Instrument Error (as 1 Std Dev)	Note?
Replicate reading 1						
2						
3						
4						
5 (optional)						
6 (optional)						
7 (optional)						
8 (optional)						
9 (optional)						
10 (optional)						
			Mean	NA	LOD =	#DIV/0!
			SD	NA	**Ttl %RSD**	#VALUE!
			n =	0		
		ProUCL distribution =				
	2-sided	Bag 95% t-LCL =		#VALUE!		
	2-sided	Bag 95% t-UCL =		#VALUE!		
	1-sided	Bag 95% t-LCL =		#VALUE!		
	1-sided	Bag 95% t-UCL =		#VALUE!		
	1-sided Bag 95% Chebyshev LCL =			#VALUE!		
	1-sided Bag 95% Chebyshev UCL =			#VALUE!		
subsampling error =		#VALUE!	instrument error =		#DIV/0!	as %RSD

RTeX Form: Partitioning of Variability for XRF Sample Analysis

Original bag: within-sample bag variability				**Replicate readings: analytical variability**		
Pb	move betw rdgs	#VALUE!	%RSD	no-move-betw rdgs	#VALUE!	%RSD
As	ave of 2 dups	6.3	%RSD	triplicates	#VALUE!	%RSD

Between-1.5-g subsamples variability				**Within-subsample bag variability**		
Pb	var betw 2 sub-	#DIV/0!	%RSD	ave RSD of 2 sub-	#VALUE!	%RSD
As	sample means	#DIV/0!	%RSD	sample RSDs	#VALUE!	%RSD

Sample duplicate mean variability			
Pb	var betw means	#DIV/0!	%RSD
As	of 2 ind. analyses	3.2	%RSD

Bag ID: **Element:**

Replicate Bag Readings	Date & Time	Reading No.	Run Time (sec)	Instrument Result (ppm)	Instrument Error (as 1 Std Dev)	Note?
Sample or Location ID =						
Replicate reading 1						
2						
3						
4						
5 (optional)						
6 (optional)						
7 (optional)						
8 (optional)						
9 (optional)						
10 (optional)						
			Mean	NA		
			SD	NA	**Ttl %RSD**	#VALUE!
			n =	0		
		ProUCL distribution =				
	2-sided	Bag 95% t-LCL =		#VALUE!		
	2-sided	Bag 95% t-UCL =		#VALUE!		
	1-sided	Bag 95% t-LCL =		#VALUE!		
	1-sided	Bag 95% t-UCL =		#VALUE!		
	1-sided Bag 95% Chebyshev LCL =			#VALUE!		
	1-sided Bag 95% Chebyshev UCL =			#VALUE!		
subsampling error =		#VALUE!	instrument error =		#DIV/0!	as %RSD

Replicate Bag Readings	Date & Time	Reading No.	Run Time (sec)	Instrument Result (ppm)	Instrument Error (as 1 Std Dev)	Note?
For duplicate sample analysis (repeat analysis of same bag)						
Replicate reading 1						
2						

Bag ID: **Element:**

Replicate Bag Readings	Date & Time	Reading No.	Run Time (sec)	Instrument Result (ppm)	Instrument Error (as 1 Std Dev)	Note?
Sample or Location ID =						
Replicate reading 1						
2						
3						
4						
5 (optional)						
6 (optional)						
7 (optional)						
8 (optional)						
9 (optional)						
10 (optional)						
			Mean	NA		
			SD	NA	**Ttl %RSD**	#VALUE!
			n =	0		
		ProUCL distribution =				
	2-sided	Bag 95% t-LCL =		#VALUE!		
	2-sided	Bag 95% t-UCL =		#VALUE!		
	1-sided	Bag 95% t-LCL =		#VALUE!		
	1-sided	Bag 95% t-UCL =		#VALUE!		
	1-sided Bag 95% Chebyshev LCL =			#VALUE!		
	1-sided Bag 95% Chebyshev UCL =			#VALUE!		
subsampling error =		#VALUE!	instrument error =		#DIV/0!	as %RSD

Replicate Bag Readings	Date & Time	Reading No.	Run Time (sec)	Instrument Result (ppm)	Instrument Error (as 1 Std Dev)	Note?
For duplicate sample analysis (repeat analysis of same bag)						
Replicate reading 1						
2						

9956297

3
4
5 (optional)
6 (optional)
7 (optional)
8 (optional)
9 (optional)
10 (optional)

		Mean	NA		
		SD	NA	**Ttl %RSD**	#VALUE!
Hypothesis		n =	0		
Test for Duplicate		ProUCL distribution =			
Agreement, p-value =		Bag 95% t-LCL =	#VALUE!		
#DIV/0!	2-sided	Bag 95% t-UCL =	#VALUE!		
#DIV/0!	2-sided	Bag 95% t-LCL =	#VALUE!		
	1-sided	Bag 95% t-UCL =	#VALUE!		
	1-sided	1-sided Bag 95% Chebyshev LCL =	#VALUE!		
		1-sided Bag 95% Chebyshev UCL =	#VALUE!		
	subsampling error =	#VALUE!	instrument error =	#DIV/0!	as %RSD

Replicate Bag Readings	Date & Time	Reading No.	Run Time (sec)	Instrument Result (ppm)	Instrument Error (as 1 Std Dev)	Note?
Replicate reading 1						
2						
3						
4						
5 (optional)						
6 (optional)						
7 (optional)						
8 (optional)						
9 (optional)						
10 (optional)						

		Mean	NA		
		SD	NA	**Ttl %RSD**	#VALUE!
		n =	0		
		ProUCL distribution =			
	2-sided	Bag 95% t-LCL =	#VALUE!		
	2-sided	Bag 95% t-UCL =	#VALUE!		
	1-sided	Bag 95% t-LCL =	#VALUE!		
	1-sided	Bag 95% t-UCL =	#VALUE!		
	1-sided Bag 95% Chebyshev LCL =		#VALUE!		
	1-sided Bag 95% Chebyshev UCL =		#VALUE!		
	subsampling error =	#VALUE!	instrument error =	#DIV/0!	as %RSD

Replicate Bag Readings	Date & Time	Reading No.	Run Time (sec)	Instrument Result (ppm)	Instrument Error (as 1 Std Dev)	Note?
Replicate reading 1						
2						
3						
4						
5 (optional)						
6 (optional)						
7 (optional)						
8 (optional)						
9 (optional)						
10 (optional)						

		Mean	NA		
		SD	NA	**Ttl %RSD**	#VALUE!
		n =	0		
		ProUCL distribution =			
	2-sided	Bag 95% t-LCL =	#VALUE!		
	2-sided	Bag 95% t-UCL =	#VALUE!		
	1-sided	Bag 95% t-LCL =	#VALUE!		
	1-sided	Bag 95% t-UCL =	#VALUE!		
	1-sided Bag 95% Chebyshev LCL =		#VALUE!		
	1-sided Bag 95% Chebyshev UCL =		#VALUE!		
	subsampling error =	#VALUE!	instrument error =	#DIV/0!	as %RSD

Replicate Bag Readings	Date & Time	Reading No.	Run Time (sec)	Instrument Result (ppm)	Instrument Error (as 1 Std Dev)	Note?
Replicate reading 1						
2						
3						
4						
5 (optional)						
6 (optional)						
7 (optional)						
8 (optional)						
9 (optional)						
10 (optional)						

		Mean	NA		
		SD	NA	**Ttl %RSD**	#VALUE!
		n =	0		
		ProUCL distribution =			
	2-sided	Bag 95% t-LCL =	#VALUE!		
	2-sided	Bag 95% t-UCL =	#VALUE!		
	1-sided	Bag 95% t-LCL =	#VALUE!		
	1-sided	Bag 95% t-UCL =	#VALUE!		
	1-sided Bag 95% Chebyshev LCL =		#VALUE!		
	1-sided Bag 95% Chebyshev UCL =		#VALUE!		
	subsampling error =	#VALUE!	instrument error =	#DIV/0!	as %RSD

3
4
5 (optional)
6 (optional)
7 (optional)
8 (optional)
9 (optional)
10 (optional)

		Mean	NA		
		SD	NA	**Ttl %RSD**	#VALUE!
Hypothesis		n =	0		
Test for Duplicate		ProUCL distribution =			
Agreement, p-value =		Bag 95% t-LCL =	#VALUE!		
#DIV/0!	2-sided	Bag 95% t-UCL =	#VALUE!		
#DIV/0!	2-sided	Bag 95% t-LCL =	#VALUE!		
	1-sided	Bag 95% t-UCL =	#VALUE!		
	1-sided	1-sided Bag 95% Chebyshev LCL =	#VALUE!		
		1-sided Bag 95% Chebyshev UCL =	#VALUE!		
	subsampling error =	#VALUE!	instrument error =	#DIV/0!	as %RSD

Replicate Bag Readings	Date & Time	Reading No.	Run Time (sec)	Instrument Result (ppm)	Instrument Error (as 1 Std Dev)	Note?
Replicate reading 1						
2						
3						
4						
5 (optional)						
6 (optional)						
7 (optional)						
8 (optional)						
9 (optional)						
10 (optional)						

		Mean	NA		
		SD	NA	**Ttl %RSD**	#VALUE!
		n =	0		
		ProUCL distribution =			
	2-sided	Bag 95% t-LCL =	#VALUE!		
	2-sided	Bag 95% t-UCL =	#VALUE!		
	1-sided	Bag 95% t-LCL =	#VALUE!		
	1-sided	Bag 95% t-UCL =	#VALUE!		
	1-sided Bag 95% Chebyshev LCL =		#VALUE!		
	1-sided Bag 95% Chebyshev UCL =		#VALUE!		
	subsampling error =	#VALUE!	instrument error =	#DIV/0!	as %RSD

Replicate Bag Readings	Date & Time	Reading No.	Run Time (sec)	Instrument Result (ppm)	Instrument Error (as 1 Std Dev)	Note?
Replicate reading 1						
2						
3						
4						
5 (optional)						
6 (optional)						
7 (optional)						
8 (optional)						
9 (optional)						
10 (optional)						

		Mean	NA		
		SD	NA	**Ttl %RSD**	#VALUE!
		n =	0		
		ProUCL distribution =			
	2-sided	Bag 95% t-LCL =	#VALUE!		
	2-sided	Bag 95% t-UCL =	#VALUE!		
	1-sided	Bag 95% t-LCL =	#VALUE!		
	1-sided	Bag 95% t-UCL =	#VALUE!		
	1-sided Bag 95% Chebyshev LCL =		#VALUE!		
	1-sided Bag 95% Chebyshev UCL =		#VALUE!		
	subsampling error =	#VALUE!	instrument error =	#DIV/0!	as %RSD