TECHNICAL MEMORANDUM

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TO:	Elliot Sigal (Cantox Environmental Inc.)	**DATE:**	February 13, 2007
FROM:	Tammie Morgan, John Goodin (Golder Associates Ltd.)	**JOB NO:**	04-1112-069 (6000)
EMAIL:	tmorgan@golder.com; jgoodin@golder.com		
RE:	Bioaccessibility Testing of Soil and Dust Samples		

1.0 INTRODUCTION AND METHODS

Golder Associates Ltd. (Golder) was retained by Cantox Environmental Inc. (Cantox) to conduct *in vitro* bioaccessibility testing of metals-contaminated soil and house dust samples from the Sudbury area. In total, 37 soil samples and 10 house dust samples were tested. The testing was conducted in support of previous bioaccessibility testing completed in 2005 in which 72 soil samples and 10 house dust samples from the Sudbury area were analyzed (Golder, 2006) for the Human Health Risk Assessment being conducted as part of the Sudbury Soils Study.

Metal bioaccessibilities were determined following both the gastric and intestinal phases of extraction. The testing was conducted according to the Standard Operating Procedure used in the previous testing (Golder, 2006) with the following modifications:

- The pH of the extraction fluid was measured at the beginning and the end of the gastric and intestinal phases; and,

- 30 mL of extraction fluid was removed from the bags following the gastric phase of extraction for metal analyses. The volume removed was replaced with fresh gastric extraction fluid to maintain a constant fluid volume in the gastric and intestinal phases.

When 1 g of a house dust sample was not available, 0.5 g of sample was used in the extraction procedure. Volumes of extraction fluid and masses of pepsin, bile and pancreatin were scaled-down accordingly (i.e., 50 mL of extraction fluid, 0.5 g of pepsin, 0.175 g of bile and 0.0175 g of pancreatin were used when 0.5 g of sample was available).

As part of Golder's intensive quality assurance and quality control (QA/QC) program additional samples were analyzed, including reagent blanks, bottle blanks, blank spikes, duplicates and standard reference materials (SRM; SRM 2711 (Montana II Soil); SRM 2583 (Trace Elements in Indoor Dust)).

Metal bioaccessibilities were calculated as a percent of the mass-balance quotient of the metal mass in the gastric or intestinal extraction fluid and the metal mass in the <250 µm soil fraction or <60 µm dust fraction. For the calculation of metal bioaccessibilities of soil samples and house dust samples in which 100 mL of extraction fluid were used, a dilution factor of 100/70 was applied to the metal concentrations in the intestinal fluid samples to account for the removal and addition of fresh gastric fluid following the gastric phase of extraction. For those house dust samples in which 50 mL of extraction fluid were used, a dilution factor of 50/20 was applied.

For soil samples where two bottle blanks were analysed, the metal mass in the extraction fluid was corrected by subtracting the average metal mass in the bottle blanks if there were detectable metal concentrations in the bottle blanks. If metal concentrations in the bottle blanks were undetectable, the metal mass in the extraction fluid was not corrected. If only one of the two bottle blanks analyzed had detectable concentrations, the metal mass in the extraction fluid was corrected for by subtracting the average of the metal mass in the bottle blanks as calculated from the detectable concentration and the detection limit. For dust samples where only one bottle blank was analysed, the metal mass in the extraction fluid was corrected by subtracting the metal mass in the bottle blank if there was a detectable metal concentration in the blank. If the metal concentration in the blank was undetectable, the metal mass in the extraction fluid was not corrected.

2.0 RESULTS OF BIOACCESSIBILITY TESTING

2.1 Soil and House Dust Samples

The results of the bioaccessibility testing of soil and house dust samples are provided in Tables 1 and 2, respectively. Included are the sample number, mean and 95% upper confidence limits of the mean. 95% upper confidence limits of the mean (95UCL) were calculated using the U.S. EPA program ProUCL (U.S. EPA Version 3.0; available at http://www.epa.gov/esd/tsc/software.htm). To remain consistent with the previous testing conducted, both the Student's-t UCL and the Chebychev UCL are provided. The UCL as recommended by the program is provided in bold text.

2.2 Quality Assurance and Quality Control

The majority of the samples analyzed as part of the QA/QC program met established control limits, supporting the bioaccessibility data. Specific details are provided below.

The start and final pH measurements of the gastric and intestinal extraction fluids met the established control limits.

Percent recoveries of metals in blank spikes met established control limits of 85-115% recovery with the exception of arsenic and selenium in one sample (BL/S-4) in which recoveries were 130% and 116%, respectively. Percent recoveries of metals in matrix spikes following the gastric phase of extraction met established control limits of 75-125% recovery for all matrix spikes analyzed. However, percent recoveries of several metals following the intestinal phase of extraction were below the established control limits for some matrix spikes analyzed (M/S-2-I, M/S-3-I and M/S-4-I).

For all reagent blanks analyzed, concentrations of the metals were below the method detection limits with the exception of copper in reagent blank R/BL-3, in which a detectable concentration of 10.10 µg/L was measured, which is slightly above the method detection limit of 10 µg/L.

As noted above, the metal mass in the extraction fluid was corrected for the metal mass in the bottle blanks to account for background levels of metals present in the extraction fluid. For most bottle blanks analyzed, metal concentrations were below the method detection limits. However, there were detectable concentrations of copper, selenium, arsenic or nickel in some blanks, although these concentrations were low.

Relative percent differences (RPDs) in metal bioaccessibilities were calculated for four duplicate soil samples and two duplicate dust samples. The RPDs in bioaccessibilities met established control limits of ±20% for the duplicate soil and dust samples analyzed with the exception of lead in soil. For example, the RPD in lead bioaccessibility following the gastric phase of extraction for samples R599 and R582 were 29% and 41%, respectively. The RPD in lead bioaccessibility following the intestinal phase of extraction for samples R599 and R570 were 23% and 23%, respectively.

Relative percent differences in metal concentrations were calculated for two standard reference materials, SRM 2711 (Montana II Soil) and SRM 2583 (Trace Elements in Indoor Dust). For SRM 2711, RPDs in metal concentrations exceeded the control limit of ± 10% in at least one of the two samples analyzed. Likewise, for SRM 2583, relative percent differences in metal concentrations exceeded the control limit (± 10%).

3.0 CLOSURE

We trust that the information in this Memorandum satisfies your needs at this time. If you have any questions or concerns please contact us at your earliest convenience.

Attachments: Table 1 – Metal Bioaccessibilities of Soil Samples from the Sudbury Area
Table 2 – Metal Bioaccessibilities of House Dust Samples from the Sudbury Area
Table 3 – Analytical Data and Calculations
Table 4 – Results of the Quality Assurance and Quality Control Program
Laboratory Bench Sheets
Chain of Custody Records
Certificates of Analyses
ProUCL Outputs

TPM/JDG/ng

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TABLES

TABLE 1
Metal Bioaccessibilities of Soil Samples from the Sudbury Area

Metal	Gastric Phase				Intestinal Phase			
	N	Mean	95UCL		N	Mean	95UCL	
			Student's-t	Chebyshev			Student's-t	Chebyshev
Arsenic	32	23.7	**26.1**	30.2	33	30.2	**33.1**	37.6
Cobalt	37	25.9	**27.9**	31.5	37	22.9	**24.5**	27
Copper	36	49.6	**53.7**	63.6	36	61	**65.2**	76.8
Lead	37	62.2	**65.6**	71.4	37	14.4	15.9	17.8
Nickel	37	35	38.5	44.2	37	34.7	**38.1**	43.6
Selenium	6	7.4	**12.2**	25.6	4	21.1	**32.6**	43.3

Notes:
For arsenic and selenium, statistics exclude samples with metal concentrations in soil and/or extraction fluid at the MDL.
Values in bold text are the recommended statistic according to ProUCL (U.S. EPA, 2004).
For nickel in the gastric phase, the recommended statistic is the approximate gamma UCL of 38.71.
For lead in the intestinal phase, the recommended statistic is the appromiate gamma UCL of 15.84.
"N" = number of samples.

TABLE 2
Metal Bioaccessibilities of House Dust Samples from the Sudbury Area

Metal	Gastric Phase				Intestinal Phase			
	N	Mean	95UCL		N	Mean	95UCL	
			Student's-t	Chebyshev			Student's-t	Chebyshev
Arsenic	10	38.6	**42.8**	48.6	10	40.8	**45.2**	51.1
Cobalt	10	28.2	**32.2**	37.6	10	31.9	**38**	46.4
Copper	10	43.9	**49.9**	58.3	10	57.6	**67.4**	80.2
Lead	8	79.1	**83.2**	88.7	10	18	**21.2**	25.6
Nickel	10	31.5	**36.4**	44	10	37.1	**42.7**	51.9
Selenium	3	23.6	NC	NC	0	NC	NC	NC

Notes:
For selenium, statistics exclude samples with metal concentrations in soil and/or extraction fluid at the MDL.
Values in bold text are the recommended statistic according to ProUCL (U.S. EPA, 2004).
"NC" = too few samples to calculate statistic.
"N" = number of samples.

TABLE 3
Analytical Data and Calculations

Soil Fraction (250 µm soil or 60 µm dust fraction)

	Units	DL	SOIL 599-S	599R-S	602-S	526-S	514-S	523-S	531-S	563-S	596-S	534-S	581-S	593-S	501-S	525-S	541-S	551-S	553-S	516-S	506-S	582-S	582R-S	554-S
soil mass	g		1.0002	1.0009	0.9997	0.9994	1.0001	0.9990	0.9996	0.9999	1.0009	1.0004	1.0012	0.9995	1.0011	0.9997	0.9993	1.0003	1.0010	0.9996	0.9994	1.0001	0.9991	0.9992
Analytical Parameters																								
Arsenic	µg/g	0.6	4.4	4.2	14.5	3.8	109.0	138.0	3.0	9.4	4.7	186.0	101.0	2.3	86.2	12.9	2.4	1.8	6.0	23.4	16.5	2.6	2.5	18.5
Cobalt	µg/g	0.3	7.2	6.9	25.6	6.4	124.0	104.0	5.4	14.5	9.1	88.9	43.9	6.6	64.1	13.2	5.5	4.5	12.1	49.8	22.2	7.5	7.5	16.5
Copper	µg/g	0.6	96.1	94.2	1320.0	59.7	1840.0	1650.0	70.2	461.0	154.0	1660.0	623.0	17.6	1070.0	240.0	38.4	21.6	141.0	2570.0	449.0	35.6	34.3	448.0
Lead	µg/g	0.5	23.1	18.8	61.0	15.3	108.0	184.0	10.3	30.8	19.9	206.0	53.4	4.3	76.2	27.1	7.6	12.0	20.2	79.6	113.0	6.6	6.2	39.5
Nickel	µg/g	0.6	96.7	90.9	819.0	81.5	2500.0	2270.0	77.2	338.0	141.0	1800.0	778.0	25.1	1030.0	261.0	48.7	29.2	198.0	1620.0	652.0	51.0	48.1	518.0
Selenium	µg/g	0.8	*0.8*	*0.8*	6.1	*0.8*	3.7	4.2	*0.8*	1.6	*0.8*	4.5	2.5	*0.8*	3.7	1.1	*0.8*	*0.8*	*0.8*	10.3	1.4	*0.8*	*0.8*	1.7

Gastric Phase Extraction

	Units	DL	SOIL R599-G	R599R-G	R602-G	R526-G	R514-G	R523-G	R531-G	R563-G	R596-G	R534-G	R581-G	R593-G	R501-G	R525-G	R541-G	R551-G	R553-G	R516-G	R506-G	R582-G	R582R-G	R554-G
Start pH			1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.51	1.51	1.51	1.51	1.51	1.51
End pH			1.58	1.64	1.65	1.66	1.68	1.68	1.67	1.70	1.71	1.75	1.80	1.79	1.78	1.79	1.78	1.79	1.55	1.59	1.62	1.61	1.66	1.64
Gastric Fluid Volume	mL		100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Analytical Parameters																								
Arsenic	ug/L	6.0	8.5	9.2	32.7	7.6	245.0	260.0	*6.0*	17.5	10.2	327.0	163.0	*6.0*	80.5	18.5	*6.0*	*6.0*	17.0	26.7	71.7	*6.0*	8.2	53.2
Cobalt	ug/L	5.0	17.3	18.3	74.6	21.3	289.0	253.0	14.7	44.8	18.5	192.0	151.0	8.2	197.0	29.5	13.6	7.6	36.4	72.8	99.9	10.5	11.2	44.5
Copper	ug/L	10.0	418.0	437.0	7430.0	275.0	5650.0	5760.0	525.0	3130.0	964.0	6710.0	2200.0	58.2	5020.0	1340.0	203.0	100.0	653.0	3160.0	17300.0	141.0	151.0	2910.0
Lead	ug/L	5.0	105.0	114.0	396.0	93.3	508.0	1060.0	87.9	213.0	139.0	1300.0	263.0	15.70	311.00	138.0	42.10	76.00	126.00	740.0	562.0	24.40	34.8	205.00
Nickel	ug/L	10.0	229.0	234.0	2400.0	321.0	6720.0	6970.0	268.0	1910.0	615.0	5470.0	3840.0	40.0	5010.0	586.0	146.0	75.5	553.0	3350.0	4860.0	122.0	125.0	2540.0
Selenium	ug/L	5.0	5.1	*5.0*	9.9	*5.0*	6.7	6.8	*5.0*	*5.0*	*5.0*	*5.0*	*5.0*	*5.0*	*5.0*	*5.0*	*5.0*	*5.0*	*5.0*	*5.0*	7.5	*5.0*	*5.0*	*5.0*

Intestinal Phase Extraction

	Units	DL	SOIL R599-I	R599R-I	R602-I	R526-I	R514-I	R523-I	R531-I	R563-I	R596-I	R534-I	R581-I	R593-I	R501-I	R525-I	R541-I	R551-I	R553-I	R516-I	R506-I	R582-I	R582R-I	R554-I
Start pH	NA	NA	7.21	7.57	7.38	7.62	7.61	7.56	7.34	7.68	7.55	7.88	7.42	7.45	7.64	7.16	7.37	7.37	7.27	7.14	7.44	7.67	7.66	7.63
End pH	NA	NA	6.86	7.37	7.24	7.44	7.33	7.33	7.04	7.50	7.29	7.81	7.17	7.35	7.43	6.91	7.14	7.22	7.24	6.91	7.35	7.50	7.43	7.43
Intestinal Fluid Volume	mL	NA	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Analytical Parameters																								
Arsenic	ug/L	6.0	7.7	8.3	26.5	9.1	125.0	211.0	*6.0*	17.8	9.3	368.0	174.0	*6.0*	102.0	20.0	6.5	*6.0*	11.6	19.8	49.7	*6.0*	*6.0*	41.5
Cobalt	ug/L	5.0	10.4	10.0	41.2	11.9	164.0	149.0	10.3	29.0	10.7	140.0	98.1	6.4	126.0	20.5	9.0	5.9	20.7	47.3	59.3	8.7	8.2	28.9
Copper	ug/L	10.0	389.0	367.0	5660.0	276.0	4720.0	4690.0	423.0	2830.0	826.0	6630.0	2690.0	64.0	5480.0	1260.0	204.0	103.0	532.0	2400.0	12000.0	140.0	131.0	2210.0
Lead	ug/L	5.0	13.5	13.8	62.4	12.4	139.0	226.0	9.2	32.7	22.2	367.0	46.6	*5.0*	61.4	21.2	*5.0*	9.7	14.7	91.7	87.8	*5.0*	*5.0*	33.9
Nickel	ug/L	10.0	168.0	158.0	1630.0	227.0	4620.0	4800.0	196.0	1320.0	408.0	4270.0	3070.0	34.8	3800.0	485.0	117.0	62.1	382.0	2310.0	3240.0	95.8	92.8	1770.0
Selenium	ug/L	5.0	*5.0*	*5.0*	10.0	*5.0*	*5.0*	*5.0*	*5.0*	*5.0*	*5.0*	*5.0*	*5.0*	*5.0*	*5.0*	*5.0*	*5.0*	*5.0*	*5.0*	*5.0*	13.3	*5.0*	*5.0*	*5.0*

Gastric Bioaccessibility

	SOIL R599	R599R	R599 average	R602	R526	R514	R523	R531	R563	R596	R534	R581	R593	R501	R525	R541	R551	R553	R516	R506	R582	R582R	R582 average	R554
Analytical Parameters																								
Arsenic	19.31	21.89	20.60	22.56	20.01	22.47	18.86	20.01	18.62	21.68	17.57	16.12	26.10	9.33	14.35	25.02	33.32	28.31	11.41	43.48	23.07	32.83	27.95	28.78
Cobalt	24.02	26.50	25.26	29.15	33.30	23.30	24.35	27.23	30.90	20.31	21.59	34.36	12.43	30.70	22.36	24.74	16.88	30.05	14.62	45.03	14.00	14.95	14.47	26.99
Copper	41.26	44.07	42.66	56.14	42.50	30.59	34.81	71.76	67.44	61.15	40.28	34.93	20.89	46.66	54.96	47.31	36.35	44.75	12.22	385.05	33.58	37.80	35.69	64.53
Lead	45.45	60.58	53.01	64.94	61.02	47.03	57.67	85.37	69.16	69.79	63.08	49.19	36.53	40.77	50.94	55.43	63.31	62.31	93.00	49.76	36.97	56.18	46.57	51.94
Nickel	23.68	25.72	24.70	29.31	39.41	26.88	30.74	34.73	56.51	43.58	30.38	49.30	15.94	48.59	22.46	30.00	25.85	27.90	20.69	74.58	23.92	26.01	24.97	49.07
Selenium	-15.62	-16.86	-16.24	5.82	-16.89	0.95	1.07	-16.88	-8.44	-16.86	-3.00	-5.39	-16.88	-3.64	-12.28	-16.89	-16.87	-16.86	-1.31	8.22	-16.87	-16.89	-16.88	-7.95

ntestinal Bioaccessibility

	SOIL R599	R599R	R599 average	R602	R526	R514	R523	R531	R563	R596	R534	R581	R593	R501	R525	R541	R551	R553	R516	R506	R582	R582R	R582 average	R554
Analytical Parameters																								
Arsenic	25.00	28.21	26.60	26.12	34.23	16.38	21.86	28.58	27.05	28.24	28.25	24.58	37.29	16.89	22.16	38.72	47.60	27.59	12.09	43.06	32.96	34.32	33.64	32.07
Cobalt	20.63	20.69	20.66	23.00	26.58	18.89	20.49	27.26	28.57	16.78	22.49	31.88	13.86	28.05	22.19	23.39	18.72	24.41	13.57	38.18	16.57	15.63	16.10	25.04
Copper	54.95	52.69	53.82	61.07	61.48	36.49	40.48	82.20	87.11	74.77	56.87	61.17	36.34	72.83	73.88	68.78	55.37	51.90	13.24	381.42	48.45	46.59	47.52	69.91
Lead	8.35	10.48	9.41	14.62	11.58	18.38	17.56	12.77	15.17	15.92	25.44	12.45	16.62	11.50	11.18	9.41	11.54	10.39	16.46	11.11	10.82	11.53	11.18	12.27
Nickel	23.63	23.54	23.58	28.30	38.40	26.35	30.19	34.79	55.46	40.49	33.81	56.16	15.23	52.54	26.11	31.98	26.44	26.95	20.31	70.86	24.58	25.19	24.89	48.63
Selenium	89.27	89.21	89.24	23.43	89.34	19.30	17.02	89.32	44.65	89.21	15.87	28.54	89.33	19.28	64.95	89.35	89.26	89.20	6.94	135.80	89.28	89.37	89.32	42.05

Notes:
"100/70" and "50/20" = dilution factor (at the end of the gastric phase 30 mL was removed for analysis and replaced with 30 mL of fresh gastric fluic
Bioaccessibilities greater than 100% imply more metal in the extraction fluid than in the soil that was extracted, which is not possible. AGAT has checked these samples and cannot identify any obvious issues
These samples have not been included in the calculations of means and 95UCLs

TABLE 3
Analytical Data and Calculations

Soil Fraction (250 µm soil or 60 µm dust fract

	Units	DL	519-S	607-S	533-S	566-S	584-S	517-S	565-S	561-S	560-S	529-S	530-S	552-S	502-S	570-S	570R-S	511-S	511R-S	512-S	513-S	522	521	520
soil mass	g		1.0005	1.0012	1.0001	1.0008	1.0004	1.0002	1.0001	0.9996	0.9994	0.9997	0.9996	0.9993	0.9994	1.0002	1.0007	1.0008	1.0010	0.9990	1.0008	not enough sample	not enough sample	not enough sample
Analytical Parameters																								
Arsenic	µg/g	0.6	31.6	5.8	16.3	4.4	42.4	58.3	4.6	12.5	3.3	8.1	9.2	4.4	164.0	17.4	16.8	5.7	5.3	23.0	3.5	N/A	N/A	N/A
Cobalt	µg/g	0.3	23.5	8.2	29.5	9.7	39.0	23.6	11.3	20.2	6.8	8.9	15.6	13.8	44.3	15.0	14.3	7.8	7.7	27.3	7.1	N/A	N/A	N/A
Copper	µg/g	0.6	269.0	329.0	1340.0	180.0	1690.0	338.0	187.0	271.0	45.1	69.0	543.0	145.0	1140.0	488.0	450.0	194.0	193.0	1350.0	54.8	N/A	N/A	N/A
Lead	µg/g	0.5	27.5	14.1	65.8	16.5	291.0	44.5	33.5	105.0	12.6	15.7	41.2	19.8	113.0	42.9	40.6	19.9	19.0	106.0	46.5	N/A	N/A	N/A
Nickel	µg/g	0.6	343.0	208.0	797.0	219.0	1280.0	426.0	157.0	391.0	56.2	102.0	474.0	238.0	749.0	343.0	328.0	122.0	120.0	865.0	46.3	N/A	N/A	N/A
Selenium	µg/g	0.8	1.2	4.4	5.1	1.1	8.4	1.4	1.3	1.3	*0.8*	*0.8*	4.5	*0.8*	4.1	3.0	2.9	1.9	1.7	5.6	*0.8*	N/A	N/A	N/A

Gastric Phase Extraction

	Units	DL	R519-G	R607-G	R533-G	R566-G	R584-G	R517-G	R565-G	R561-G	R560-G	R529-G	R530-G	R552-G	R502-G	570-G	570R-G	511-G	511R-G	512-G	513-G	522	521	520
Start pH			1.51	1.51	1.51	1.51	1.51	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.51	1.51	1.51	1.51	1.51	1.51	N/A	N/A	N/A
End pH			1.68	1.69	1.67	1.67	1.69	1.71	1.71	1.73	1.73	1.74	1.74	1.80	1.75	1.68	1.65	1.70	1.66	1.67	1.69	N/A	N/A	N/A
Gastric Fluid Volume	mL		100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100			
Analytical Parameters																								
Arsenic	ug/L	6.0	94.8	22.7	44.3	16.0	129.0	143.0	8.6	30.2	10.2	20.0	28.1	14.1	233.0	38.3	36.3	11.9	12.4	46.9	6.5	N/A	N/A	N/A
Cobalt	ug/L	5.0	78.0	26.4	60.8	15.5	82.7	55.7	39.5	69.6	16.8	21.7	50.6	42.7	119.0	43.4	43.3	17.4	17.9	77.1	10.2	N/A	N/A	N/A
Copper	ug/L	10.0	1300.0	2580.0	7400.0	998.0	9510.0	1750.0	1310.0	1400.0	194.0	377.0	3700.0	555.0	6880.0	2930.0	2890.0	1280.0	1310.0	7370.0	251.0	N/A	N/A	N/A
Lead	ug/L	5.0	149.0	91.80	451.00	123.00	2010.0	269.0	247.00	626.0	83.0	129.0	249.0	153.00	507.0	314.0	247.0	133.0	138.0	749.0	307.0	N/A	N/A	N/A
Nickel	ug/L	10.0	1110.0	606.0	2100.0	319.0	3380.0	1290.0	728.0	1080.0	159.0	452.0	2420.0	856.0	3760.0	1600.0	1600.0	440.0	459.0	3530.0	95.8	N/A	N/A	N/A
Selenium	ug/L	5.0	*5.0*	*5.0*	*5.0*	*5.0*	*5.0*	*5.0*	*5.0*	*5.0*	*5.0*	*5.0*	*5.0*	*5.0*	*5.0*	8.5	*5.0*	10.6	7.4	14.1	7.3	N/A	N/A	N/A

Intestinal Phase Extraction

	Units	DL	R519-I	R607-I	R533-I	R566-I	R584-I	R517-I	R565-I	R561-I	R560-I	R529-I	R530-I	R552-I	R502-I	570-I	570R-I	511-I	511R-I	512-I	513-I	522	521	520
Start pH	NA	NA	7.53	7.23	7.41	7.69	7.00	7.27	7.57	7.27	7.47	7.13	7.62	7.58	7.28	7.11	7.21	7.57	7.50	7.53	7.90	N/A	N/A	N/A
End pH	NA	NA	7.29	6.86	7.17	7.50	6.91	7.14	7.33	7.14	7.35	6.91	7.44	7.33	7.24	6.91	6.86	7.33	7.35	7.29	7.81	N/A	N/A	N/A
Intestinal Fluid Volume	mL	NA	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	N/A	N/A	N/A
Analytical Parameters																								
Arsenic	ug/L	6.0	62.1	12.5	38.3	12.9	85.4	82.2	14.8	29.3	11.4	17.9	25.7	16.6	198.0	32.6	33.0	10.8	12.0	35.8	9.1	N/A	N/A	N/A
Cobalt	ug/L	5.0	50.0	15.5	37.8	10.8	43.0	35.4	24.2	41.8	9.2	12.2	32.1	24.7	66.3	22.8	24.5	11.7	11.5	45.0	8.1	N/A	N/A	N/A
Copper	ug/L	10.0	1150.0	1770.0	6010.0	766.0	6430.0	1370.0	1230.0	1220.0	201.0	336.0	2910.0	572.0	5490.0	2280.0	2350.0	918.0	934.0	4990.0	217.0	N/A	N/A	N/A
Lead	ug/L	5.0	15.5	7.1	82.7	16.0	297.0	66.0	40.3	107.0	18.0	11.4	58.4	50.0	71.0	49.7	37.2	13.1	12.5	81.9	33.2	N/A	N/A	N/A
Nickel	ug/L	10.0	830.0	407.0	1490.0	254.0	2150.0	878.0	500.0	767.0	115.0	308.0	1580.0	614.0	2440.0	1040.0	1100.0	330.0	338.0	2350.0	81.6	N/A	N/A	N/A
Selenium	ug/L	5.0	*5.0*	*5.0*	*5.0*	*5.0*	6.2	*5.0*	*5.0*	*5.0*	*5.0*	*5.0*	*5.0*	*5.0*	9.6	*5.0*	6.3	*5.0*	*5.0*	6.6	*5.0*	N/A	N/A	N/A

Gastric Bioaccessibility

	R519	R607	R533	R566	R584	R517	R565	R561	R560	R529	R530	R552	R502	570	570R	570 average	511	511R	511 average	512	513	522	521	520
Analytical Parameters																								
Arsenic	29.99	39.09	27.18	36.33	30.41	24.52	18.69	24.17	30.93	24.70	30.56	32.07	14.22	22.01	21.59	21.80	20.86	23.37	22.12	20.41	18.56	N/A	N/A	N/A
Cobalt	33.17	32.16	20.61	15.97	21.20	23.60	34.95	34.47	24.72	24.39	32.45	30.96	26.88	28.93	30.26	29.59	22.29	23.22	22.76	28.27	14.35	N/A	N/A	N/A
Copper	47.51	77.67	55.06	54.21	56.12	51.13	68.90	50.89	38.28	51.54	67.77	36.82	60.20	59.59	63.70	61.65	64.82	66.70	65.76	54.49	41.86	N/A	N/A	N/A
Lead	54.15	65.03	68.53	74.49	69.04	60.44	73.72	59.64	65.91	82.19	60.46	77.33	44.89	73.18	60.79	66.99	66.78	72.56	69.67	70.73	65.97	N/A	N/A	N/A
Nickel	32.35	29.10	26.35	14.55	26.40	30.28	46.36	27.63	28.31	44.33	51.08	35.99	50.23	46.64	48.75	47.69	36.04	38.21	37.12	40.85	20.67	N/A	N/A	N/A
Selenium	-11.24	-3.06	-2.65	-12.26	-1.61	-9.64	-10.38	-10.39	-16.89	-16.88	-3.00	-16.89	-3.29	7.17	-4.65	1.26	22.35	6.17	14.26	13.85	11.87	N/A	N/A	N/A

ntestinal Bioaccessibility

	R519	R607	R533	R566	R584	R517	R565	R561	R560	R529	R530	R552	R502	570	570R	570 average	511	511R	511 average	512	513	522	521	520
Analytical Parameters																								
Arsenic	28.06	30.75	33.56	41.85	28.76	20.14	45.96	33.50	49.38	31.58	39.92	53.93	17.26	26.76	28.04	27.40	27.05	32.31	29.68	22.26	37.11	N/A	N/A	N/A
Cobalt	30.38	26.97	18.30	15.89	15.74	21.42	30.59	29.57	19.34	19.59	29.41	25.59	21.39	21.71	24.46	23.08	21.41	21.31	21.36	23.57	16.28	N/A	N/A	N/A
Copper	60.02	75.93	63.86	59.22	54.17	57.08	92.49	63.32	57.61	65.60	76.08	54.50	68.60	66.17	73.94	70.05	66.13	67.64	66.89	52.65	51.51	N/A	N/A	N/A
Lead	8.05	7.18	17.95	13.84	14.57	21.18	17.18	14.56	20.42	10.38	20.26	36.10	8.98	16.55	13.08	14.81	9.40	9.39	9.39	11.05	10.19	N/A	N/A	N/A
Nickel	34.22	27.37	26.56	16.03	23.90	29.17	44.76	27.74	27.20	42.02	47.40	36.40	46.41	42.97	47.53	45.25	37.67	39.24	38.45	38.72	22.68	N/A	N/A	N/A
Selenium	59.49	16.21	14.00	64.88	10.54	51.01	54.94	54.97	89.34	89.31	15.88	89.35	33.47	23.80	31.01	27.41	37.56	41.97	39.77	16.85	89.21	N/A	N/A	N/A

TABLE 3
Analytical Data and Calculations

Soil Fraction (250 µm soil or 60 µm dust fract

	Units	DL	DUST 621-D	618-D	614-D	614R-D	617-D	547-D	574-D	616-D	619-D	605-D	564-D
soil mass	g		0.5006	0.5004	1.0008	1.0008	0.9998	0.5006	0.5006	0.5006	0.5004	0.5012	0.5012
Analytical Parameters													
Arsenic	µg/g	0.6	6.7	10.0	7.9	8.4	5.9	10.2	22.2	13.9	8.0	18.7	38.3
Cobalt	µg/g	0.3	19.9	23.6	35.4	36.8	13.1	10.6	12.8	22.9	17.0	9.3	7.2
Copper	µg/g	0.6	431.0	386.0	545.0	579.0	183.0	331.0	460.0	604.0	310.0	157.0	187.0
Lead	µg/g	0.5	60.1	80.1	65.9	66.7	54.5	115.0	64.0	73.1	84.8	28.5	52.0
Nickel	µg/g	0.6	368.0	350.0	571.0	596.0	165.0	189.0	270.0	494.0	252.0	110.0	77.7
Selenium	µg/g	0.8	4.2	3.6	3.5	3.9	1.3	1.4	1.8	6.6	3.5	1.3	1.4

Gastric Phase Extraction

	Units	DL	DUST 621-G	618-G	614-G	614R-G	617-G	547-G	574-G	616-G	619-G	605-G	564-G
Start pH			1.45	1.45	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51
End pH			1.82	1.78	1.71	1.68	1.73	1.86	1.87	1.83	1.91	1.83	1.90
Gastric Fluid Volume	mL		50	50	100	100	100	50	50	50	50	50	50
Analytical Parameters													
Arsenic	ug/L	6.0	32.1	33.3	28.1	30.9	21.3	38.6	101.0	66.6	35.1	56.3	108.0
Cobalt	ug/L	5.0	45.8	58.5	58.6	58.1	36.3	27.7	36.5	70.3	49.3	32.5	30.0
Copper	ug/L	10.0	1250.0	1370.0	2180.0	2190.0	774.0	1880.0	2580.0	2570.0	1200.0	712.0	1170.0
Lead	ug/L	5.0	437.0	591.0	494.00	475.00	421.00	912.00	790.00	621.00	764.00	234.00	522.00
Nickel	ug/L	10.0	705.0	997.0	1120.0	1180.0	477.0	813.0	928.0	1480.0	756.0	451.0	319.0
Selenium	ug/L	5.0	8.6	*5.0*	*5.0*	*5.0*	*5.0*	*5.0*	6.9	7.9	*5.0*	*5.0*	*5.0*

Intestinal Phase Extraction

	Units	DL	DUST 621-I	618-I	614-I	614R-I	617-I	547-I	574-I	616-I	619-I	605-I	564-I
Start pH	NA	NA	7.14	7.81	7.42	7.85	7.67	7.45	7.90	7.43	7.88	7.74	7.19
End pH	NA	NA	6.91	7.81	7.17	7.81	7.50	7.35	7.81	7.17	7.81	7.50	6.86
Intestinal Fluid Volume	mL	NA	50	50	100	100	100	50	50	50	50	50	50
Analytical Parameters													
Arsenic	ug/L	6.0	19.2	23.5	26.5	28.4	21.2	20.8	50.7	35.9	19.4	31.0	52.6
Cobalt	ug/L	5.0	19.9	24.3	38.5	41.5	26.1	12.3	17.4	30.0	22.2	15.0	16.0
Copper	ug/L	10.0	683.0	754.0	1630.0	1670.0	656.0	1050.0	1520.0	1250.0	602.0	402.0	643.0
Lead	ug/L	5.0	51.6	33.4	88.80	64.80	59.20	63.50	59.40	67.80	60.40	12.90	55.90
Nickel	ug/L	10.0	336.0	499.0	857.0	938.0	373.0	370.0	469.0	762.0	349.0	193.0	153.0
Selenium	ug/L	5.0	*5.0*	*5.0*	*5.0*	*5.0*	*5.0*	*5.0*	*5.0*	*5.0*	*5.0*	*5.0*	*5.0*

Gastric Bioaccessibility

	DUST 621	618	614	614R	614 average	617	547	574	616	619	605	564
Analytical Parameters												
Arsenic	47.85	33.27	35.54	36.76	36.15	36.11	37.80	45.44	47.86	43.84	30.03	28.13
Cobalt	22.99	24.77	16.54	15.78	16.16	27.72	26.10	28.48	30.66	28.98	34.86	41.57
Copper	28.32	34.74	39.71	37.55	38.63	41.54	55.88	55.41	42.04	37.78	43.46	60.92
Lead	72.62	73.72	74.90	71.16	73.03	77.26	79.21	123.29	84.85	90.02	81.91	100.14
Nickel	19.13	28.46	19.60	19.78	19.69	28.91	42.96	34.33	29.92	29.98	40.90	40.96
Selenium	20.45	13.88	14.27	12.81	13.54	38.47	35.67	38.29	11.96	14.27	38.37	35.63

ntestinal Bioaccessibility

	DUST 621	618	614	614R	614 average	617	547	574	616	619	605	564
Analytical Parameters												
Arsenic	47.70	42.72	37.76	38.74	38.25	37.78	35.25	49.83	52.99	40.59	32.81	30.08
Cobalt	24.97	25.72	15.52	16.10	15.81	28.47	28.97	33.94	32.71	32.62	40.23	55.42
Copper	38.28	47.35	42.18	40.69	41.44	49.70	77.53	81.30	50.75	46.71	60.31	82.78
Lead	21.44	10.42	19.23	13.87	16.55	15.52	13.79	23.18	23.16	17.79	11.29	26.81
Nickel	22.80	35.61	21.42	22.47	21.94	32.30	48.88	43.37	38.52	34.60	43.76	49.11
Selenium	29.73	34.69	20.39	18.30	19.35	54.96	89.18	69.36	18.92	35.69	95.92	89.07

TABLE 4
Results of the Quality Assurance and Quality Control Program

Standard Reference Materials

Parameter	SOIL SRM2711 Certified Value µg/g	SRM 2711-S µg/g	SRM2711-2-S µg/g	SRM 2711-S %recovery	SRM2711-2-S %recovery	SRM 2711-S RPD	SRM2711-2-S RPD	SRM 2711-2-G gastric µg/L	SRM 2711-2-I intestinal µg/L	SRM 2711-4-G gastric µg/L	SRM 2711-4-I intestinal µg/L	SRM 2711-2-G gastric %bioaccessibility	SRM 2711-2-I intestinal %bioaccessibility	SRM 2711-4-G gastric %bioaccessibility	SRM 2711-4-I intestinal %bioaccessibility
Arsenic	105	84.10	82.10	80.10	78.19	22.1047065	24.4788883	572	377	506	382	67.96	63.99	61.59	66.42
Cobalt	10	8.10	7.20	81.00	72.00	20.99447514	32.55813953	38.5	24.1	35.5	24.9	47.49	42.47	49.27	49.37
Copper	114	101.00	102.00	88.60	89.47	12.09302326	11.11111111	484	403	412	411	45.76	54.24	38.26	54.83
Lead	1162	897.00	974.00	77.19	83.82	25.7406508	17.60299625	8610	2210	8020	1430	95.91	35.17	82.28	20.96
Nickel	20.6	15.50	16.40	75.24	79.61	28.25484765	22.7027027	44.6	36.9	36	32.1	28.75	26.57	21.94	20.93
Selenium	1.52	1.50	0.90	98.68	59.21	1.324503311	51.23966942	13.5	5.4	*5*	*5*	47.63	51.39 -	14.99	79.31
Soil Mass (g)												1.0008	1.0008	1.0007	1.0007
Extraction Fluid Volume (mL)												100	100	100	100

Parameter	DUST SRM2583 Certified Value µg/g	SRM2583-D µg/g	SRM2583-D %recovery	SRM2583-D RPD	SRM2583 gastric µg/L	SRM2583 intestinal µg/L	SRM2583 gastric %bioaccessibility	SRM2583 intestinal %bioaccessibility
Arsenic	7	5.20	74.29	29.50819672	33.5	26.5	64.38	72.75
Cobalt	NV	3.30	NV	NV	16.3	12	49.36	51.91
Copper	NV	204.00	NV	NV	878	831.00	42.32	57.47
Lead	85.9	69.00	80.33	21.82052937	517	178.00	74.88	36.83
Nickel	NV	37.70	NV	NV	246	187	65.21	70.81
Selenium	NV	*0.80*	NV	NV	*5*	*5*	62.46	89.22
Soil Mass (g)							1.0007	1.0007
Extraction Fluid Volume (mL)							100	100

Control Limit = ±10% RPD

Spikes

Parameter	SOIL Spike	BL/S-2 soil conc	M/S-2-G gastric ug/L	M/S-2-I intestinal ug/L	BL/S-4 ug/L	M/S-4-G gastric ug/L	M/S-4-I intestinal ug/L	BL/S-2 %recovery	M/S-2-G gastric %recovery	M/S-2-I intestinal %recovery	BL/S-4 %recovery	M/S-4-G gastric %recovery	M/S-4-I intestinal %recovery
Arsenic	1000	1,090.00	1,110.00	783.00	1,300.00	1,060.00	815.00	109.00	111.00	78.30	130.00	106.00	81.50
Cobalt	10000	9,300.00	8,980.00	5,990.00	10,400.00	8,760.00	6,500.00	93.00	89.80	59.90	104.00	87.60	65.00
Copper	10000	9,370.00	9,210.00	5,840.00	10,400.00	8,730.00	6,160.00	93.70	92.10	58.40	104.00	87.30	61.60
Lead	10000	9,190.00	9,010.00	1,250.00	10,800.00	8,160.00	1,020.00	91.90	90.10	12.50	108.00	81.60	10.20
Nickel	10000	9,420.00	9,040.00	6,260.00	10,500.00	8,600.00	6,420.00	94.20	90.40	62.60	105.00	86.00	64.20
Selenium	1000	1,040.00	1,090.00	726.00	1,160.00	1,020.00	749.00	104.00	109.00	72.60	116.00	102.00	74.90

Parameter	DUST BL/S-3 ug/L	M/S-3-G gastric ug/L	M/S-3-I intestinal ug/L	BL/S-3 %recovery	M/S-3-G gastric %recovery	M/S-3-I intestinal %recovery
Arsenic	1,008.00	1,060.00	743.00	100.80	106.00	74.30
Cobalt	9,110.00	9,200.00	5,890.00	91.10	92.00	58.90
Copper	9,170.00	9,340.00	5,680.00	91.70	93.40	56.80
Lead	8,710.00	8,240.00	2,980.00	87.10	82.40	29.80
Nickel	9,240.00	9,200.00	5,900.00	92.40	92.00	59.00
Selenium	1,030.00	1,060.00	680.00	103.00	106.00	68.00

Control Limit = 85-115% (blank spike); 75-125% recovery (matrix spike)

Bottle Blanks

Parameter	SOIL B/BL-2-G gastric ug/L	B/BL-2-I intestinal ug/L	B/BL-4-G gastric ug/L	B/BL-4-I intestinal ug/L	B/BL-2-G metal mass ug	B/BL-2-I metal mass ug	B/BL-4-G metal mass ug	B/BL-4-I metal mass ug	gastric average metal mass ug	intestinal average metal mass ug
Arsenic	*6.00*	*6.00*	*6.00*	*6.00*	0.60	0.60	0.6	0.60	0	0
Cobalt	*5.00*	*5.00*	*5.00*	*5.00*	0.50	0.50	0.5	0.50	0	0
Copper	25.90	31.00	17.00	24.00	2.59	3.10	1.7	2.40	2.15	2.75
Lead	*5.00*	*5.00*	*5.00*	*5.00*	0.50	0.50	0.5	0.50	0	0
Nickel	*10.00*	13.00	*10.00*	*10.00*	1.00	1.30	1	1.00	0	1.15
Selenium	7.70	*5.00*	*5.00*	*5.00*	0.77	0.50	0.5	0.50	0.64	0
Gastric Fluid Volume (mL)					100	100	100	100.00		

Parameter	DUST B/BL-3-G gastric ug/L	B/BL-3-I intestinal ug/L	B/BL-3-G metal mass ug	B/BL-3-I metal mass ug
Arsenic	*6.00*	8.00	0	0.80
Cobalt	*5.00*	*5.00*	0	0
Copper	14.00	27.90	1.40	2.79
Lead	*5.00*	*5.00*	0	0
Nickel	*10.00*	*10.00*	0	0
Selenium	*5.00*	*5.00*	0	0
Gastric Fluid Volume (mL)			100	100

Control Limit = <25µg/L (lead)
If both bottle blanks had detectable concentrations, the metal mass in the extraction fluid was corrected for by subtracting the average metal mass in the bottle blanks.
If one bottle blank and not the other had detectable concentrations, the metal mass in the extraction fluid was corrected for by subtracting the average of the detectable concentration and of the detection limit.

TABLE 4
Results of the Quality Assurance and Quality Control Program

Reagent Blanks

	SOIL		DUST
	R/BL-4		R/BL-3
Parameter	ug/L		ug/L
Arsenic	*6.00*		*6.00*
Cobalt	*5.00*		*5.00*
Copper	*10.00*		10.10
Lead	*5.00*		*5.00*
Nickel	*10.00*		*10.00*
Selenium	*5.00*		*5.00*

Control Limit = <25µg/L (lead)

Duplicates

	SOIL					DUST
	R599	R582	570	511		614
	RPD	RPD	RPD	RPD		RPD
Parameter	gastric	gastric	gastric	gastric		gastric
Arsenic	-12.47953791	-	1.904003498	-11.35952181		-3.36144955
Cobalt	-9.797606925	-6.551547207	-4.497649847	-4.102833451		4.734621026
Copper	-6.604630244	-11.8394309	-6.669530868	-2.852350642		5.589594243
Lead	-28.55498673	-41.25497008	18.48714132	-8.293789818		5.127598545
Nickel	-8.270570555	-8.378747868	-4.420986083	-5.858819726		-0.9334228
Selenium	-	-	-	113.4625756		-
	R599	R582	570	511		614
	RPD	RPD	RPD	RPD		RPD
Parameter	intestinal	intestinal	intestinal	intestinal		intestinal
Arsenic	-12.07086988	-	-4.677828494	-17.74521844		-2.56410256
Cobalt	-0.263928449	5.817205835	-11.90625191	0.453821397		-3.62451921
Copper	4.206754615	3.925233412	-11.09475173	-2.261308118		3.597876706
Lead	-22.62820179	-6.349940758	23.40153757	0.080265345		32.42606894
Nickel	0.340557187	-2.475647525	-10.06468459	-4.086866581		-4.74516662
Selenium	-	-	-	-		-

Control Limit = ±20% RPD
"-" = RPD not calculated for this chemical because concentration below the MDL in soil and/or extraction fluid.

Pepsin

	Pepsin
Parameter	µg/g
Arsenic	<0.6
Cobalt	<0.3
Copper	<0.6
Lead	<0.5
Nickel	<0.6
Selenium	<0.8

LABORATORY BENCH SHEETS

(5)

METALS BIOACCESSIBILITY IN SOILS TESTING – DATA SHEETS

Extraction Fluid Preparation

Date of preparation: 02 Jan '07

Prepared by: TAMMIE MORGAN

Notes:

Extraction Fluid Preparation.

Component	Amount/Value in 1 L	Amount/Value in 2 L	Acceptance Range	Actual Amount/Value
Deionized water	~ 0.8 L	~ 1.8 L	n/a	~1.6L
Glycine	30.03 g	60.06 g	n/a	30.03g + 30.03g
HCl[abc]	~30 mL	~60 mL	n/a	≈60mL
pH	1.50	1.50	1.45–1.55	1.50
Final volume	1 L	2 L	n/a	2L

[a]The pH must be adjusted while the solution is at 37 °C.

[b]Concentrated HCl, trace metal grade.

[c]Add concentrated HCl until the solution reaches a pH of 1.50 ±0.05. This will require ~30 mL and ~60 mL for a 1 L and a 2 L solution, respectively. Extraction fluid can be prepared in advance, but the pH must be checked and adjusted if necessary (@ 37 °C!) prior to use.

METALS BIOACCESSIBILITY IN SOILS TESTING – DATA SHEETS

Gastric and Intestinal Phase Extractions

Date of extraction: 03 Jan. '04

Extracted by: TAMMIE MORGAN

Site soil samples: 04-1112-069 (6000)

Notes:

Gastric Phase Extraction.

Sample	Sample Preparation			Gastric Phase Extraction									
	Mass Pepsin (g)	Volume Gastric Fluid (mL)	Mass Soil (g)	Start Time	End Time	Elapsed Time (min)	Start pH	End pH	Δ pH	Start Temp (°C)	End Temp (°C)	Start Speed (cycles/min)	End Speed (cycles/min)
Acceptance Range	1.00 ±0.05	100 ±0.5	1.00 ±0.05	n/a	n/a	120 ±5	n/a	n/a	1.5 ±0.5	37 ±2	37 ±2	30 ±2	30 ±2
BLBL-2	0.9994	100	—	9:46	11:46	120	1.51	1.59	0.08	38	37	30	30
BLLS-2	—	100	—	″	″	″	″	″	″	″	″	″	″
MLS-2	0.9998	100	—					1.57	0.06				
SRM2711-2	1.0005	100	1.0008					1.71	0.2				
510	1.0002	100	1.0002					1.68	0.17				
510R	1.0002	100	1.0007					1.65	0.14				
511	1.0011	100	1.0008					1.70	0.19				
511R	1.0006	100	1.0010					1.66	0.15				
512	1.0000	100	0.9990					1.67	0.16				
513	1.0003	100	1.0008					1.69	0.18				
522	NOT ENOUGH SAMPLE												

↓ Soil

Intestinal Phase Extraction.

Sample	Sample Preparation				Intestinal Phase Extraction							end pH
	Volume NaOH[a] (mL)	pH	Mass Bile (g)	Mass Pancreatin (g)	Start Time	End Time	Elapsed Time (min)	Start Temp (°C)	End Temp (°C)	Start Speed (cycles/min)	End Speed (cycles/min)	
Acceptance Range	n/a	7.5 ±0.5	0.35	0.035	n/a	n/a	120	37 ±2	37 ±2	30 ±2	30 ±2	
B/BL-2	3.4	8.0	0.3501	0.0348	13:02	15:02	120	36	36	30	30	7.5
BLS-2	—	—	—	—	—	—	—	—	—	—	—	—
MS-2	3.1	7.68	0.3506	0.0349	↓	↓	↓	↓	↓	↓	↓	7.5
SRM2711-2	3.2	8.0	0.3495	0.0349								7.5
570	2.9	7.11	0.3502	0.0353								6.91
570R	3	7.21	0.3510	0.0355								6.86
511	3	7.57	0.3511	0.0352								7.33
511R	3	7.50	0.3508	0.0347								7.35
512	3	7.53	0.3496	0.0350								7.29
513	3	7.90	0.3503	0.0346	↓	↓	↓	↓	↓	↓	↓	7.81
522	NOT ENOUGH SAMPLE											

[a]50% w/w NaOH.

100 mL H_2O + 50 g NaOH

Additional Notes:

At completion of the gastric phase, 30mL was removed for analysis and replaced with fresh gastric extraction fluid

✓ (6)

METALS BIOACCESSIBILITY IN SOILS TESTING – DATA SHEETS

Extraction Fluid Preparation

Date of preparation: Jan. 03/2007

Prepared by: Tammie Morgan

Notes: Sample of this extraction fluid (gastric & intestinal fluid) sent to AGAT as requested by Hannah Vandervloo.
gastric = 100mL @ pH 1.5 + 1.00g pepsin
intestinal = 100 mL @ pH 5.5 + 0.35g bile + 0.025g pancreatin + 1.0g trypsin

Extraction Fluid Preparation.

Component	Amount/Value in 1 L	Amount/Value in 2 L	Acceptance Range	Actual Amount/Value
Deionized water	~ 0.8 L	~ 1.8 L	n/a	~1.6 L
Glycine	30.03 g	60.06 g	n/a	30.03g + 30.03g
HCl[abc]	~30 mL	~60 mL	n/a	~60mL
pH	1.50	1.50	1.45–1.55	1.51
Final volume	1 L	2 L	n/a	2L

[a]The pH must be adjusted while the solution is at 37 °C.

[b]Concentrated HCl, trace metal grade.

[c]Add concentrated HCl until the solution reaches a pH of 1.50 ±0.05. This will require ~30 mL and ~60 mL for a 1 L and a 2 L solution, respectively. Extraction fluid can be prepared in advance, but the pH must be checked and adjusted if necessary (@ 37 °C!) prior to use.

METALS BIOACCESSIBILITY IN SOILS TESTING – DATA SHEETS

Gastric and Intestinal Phase Extractions

Date of extraction: Jan 04/2007

Extracted by: Tammie Morgan

Site soil samples: 04-1112-069 (6000) (DUST)

Notes:

Gastric Phase Extraction.

Sample	Sample Preparation			Gastric Phase Extraction									
	Mass Pepsin (g)	Volume Gastric Fluid (mL)	Mass Soil (g)	Start Time	End Time	Elapsed Time (min)	Start pH	End pH	Δ pH	Start Temp (°C)	End Temp (°C)	Start Speed (cycles/min)	End Speed (cycles/min)
Acceptance Range	1.00 ±0.05	100 ±0.5	1.00 ±0.05	n/a	n/a	120 ±5	n/a	n/a	1.5 ±0.5	37 ±2	37 ±2	30 ±2	30 ±2
R/BL-3	—	100	—	9:13	11:13	120	1.51	—	—	37	36	30	30
SRM 2583	0.9997	100	1.0007					1.76	0.25				
614	1.0004	100	1.0008					1.71	0.2				
614R	1.0001	100	1.0008					1.68	0.17				
617	1.0012	100	6.9998					1.73	0.22				
547	0.5001	50	0.5006					1.86	0.35				
574	0.5005	50	0.5006					1.87	0.36				
616	0.5007	50	0.5006					1.83	0.32				
619	0.5013	50	0.5004					1.91	0.40				
—	—	—	—					—	—				
605	0.5005	50	0.5012					1.83	0.32				
—	—	—	—					—	—				
569	0.5004	50	0.5012					1.90	0.39				

↓ DUST

Intestinal Phase Extraction.

Sample	Sample Preparation				Intestinal Phase Extraction							End pH
	Volume NaOH[a] (mL)	pH	Mass Bile (g)	Mass Pancreatin (g)	Start Time	End Time	Elapsed Time (min)	Start Temp (°C)	End Temp (°C)	Start Speed (cycles/min)	End Speed (cycles/min)	
Acceptance Range	n/a	7.5 ±0.5	0.35	0.035	n/a	n/a	120	37 ±2	37 ±2	30 ±2	30 ±2	
R/BL-3	—	—	—	—	12:31	2:31	120	37	36	30	30	—
SRM 2583	2.9	7.61	0.3498	0.0349								7.33
614	4.0	7.42	0.3503	0.0348								7.17
614R	2.5	7.85	0.3504	0.0349								7.81
617	2.9	7.67	0.3502	0.0352								7.50
547	1.5	7.45	0.1751	0.0175								7.35
574	1.5	7.90	0.1750	0.0175								7.81
616	1.6	7.43	0.1751	0.0175								7.17
619	1.5	7.88	0.1752	0.0176								7.81
621	—	—	—	—								—
605	1.5	7.74	0.1747	0.0173								7.50
618	—	—	—	—								—
564	1.5	7.19	0.1752	0.0176								6.86

[a]~~50%~~ w/w NaOH.

100mL H_2O + 50g NaOH

Additional Notes: At completion of the gastric phase, 30 mL was removed for analysis and replaced with fresh gastric extraction fluid.

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METALS BIOACCESSIBILITY IN SOILS TESTING – DATA SHEETS

Extraction Fluid Preparation

Date of preparation: Jan 04/2007

Prepared by: Tammie Morgan

Notes:

Extraction Fluid Preparation.

Component	Amount/Value in 1 L	Amount/Value in 2 L	Acceptance Range	Actual Amount/Value
Deionized water	~ 0.8 L	~ 1.8 L	n/a	~1.6L
Glycine	30.03 g	60.06 g	n/a	30.03g + 30.03g
HCl[abc]	~30 mL	~60 mL	n/a	~60mL
pH	1.50	1.50	1.45–1.55	1.50
Final volume	1 L	2 L	n/a	2L

[a]The pH must be adjusted while the solution is at 37 °C.

[b]Concentrated HCl, trace metal grade.

[c]Add concentrated HCl until the solution reaches a pH of 1.50 ±0.05. This will require ~30 mL and ~60 mL for a 1 L and a 2 L solution, respectively. Extraction fluid can be prepared in advance, but the pH must be checked and adjusted if necessary (@ 37 °C!) prior to use.

pH of extraction fluid used for dust samples = 1.45

pH of extraction fluid used for soil samples = 1.53

METALS BIOACCESSIBILITY IN SOILS TESTING – DATA SHEETS

Gastric and Intestinal Phase Extractions

Date of extraction: 05 Jan. '06

Extracted by: Tammie Morgan

Site soil samples: 04-1112-069 (6080)

Notes: Not enough sample to re-run #521

Gastric Phase Extraction.

Sample	Sample Preparation			Gastric Phase Extraction									
	Mass Pepsin (g)	Volume Gastric Fluid (mL)	Mass Soil (g)	Start Time	End Time	Elapsed Time (min)	Start pH	End pH	Δ pH	Start Temp (°C)	End Temp (°C)	Start Speed (cycles/min)	End Speed (cycles/min)
Acceptance Range	1.00 ±0.05	100 ±0.5	1.00 ±0.05	n/a	n/a	120 ±5	n/a	n/a	1.5 ±0.5	37 ±2	37 ±2	30 ±2	30 ±2
* 621	1.0001	50	0.5006	9:59	11:59	120	1.45	1.82	0.37	36	36	30	30
618	0.4995	50	0.5004	↓	↓	↓	1.45	1.78	0.33	↓	↓	↓	↓
B/BL-3	1.0001	100	—	↓	↓	↓	1.45	1.62	0.17	↓	↓	↓	↓
L/S-3	—	100	—	—	—	—	1.45	—	—	—	—	—	—
M/S-3	0.9999	100	—	↓	↓	↓	1.45	1.67	0.22	↓	↓	↓	↓
R517	0.9998	100	1.0002	↓	↓	↓	1.53	1.71	0.18	↓	↓	↓	↓
R565	1.0008	100	1.0001	↓	↓	↓	1.53	1.71	0.18	↓	↓	↓	↓
R561	1.0010	100	0.9996	↓	↓	↓	1.53	1.73	0.20	↓	↓	↓	↓
R560	0.9999	100	0.9994	↓	↓	↓	1.53	1.73	0.20	↓	↓	↓	↓
R529	0.9997	100	0.9994	↓	↓	↓	1.53	1.74	0.21	↓	↓	↓	↓
R530	0.9999	100	0.9996	↓	↓	↓	1.53	1.74	0.21	↓	↓	↓	↓
R552	1.0002	100	0.9993	↓	↓	↓	1.53	1.80	0.27	↓	↓	↓	↓
502	0.9996	100	0.9999	↓	↓	↓	1.53	1.75	0.22	↓	↓	↓	↓

dust ↑ ↓ soil

* mass pepsin added should have been 0.5g.

Intestinal Phase Extraction.

Sample	Sample Preparation				Intestinal Phase Extraction						
	Volume NaOH[a] (mL)	pH	Mass Bile (g)	Mass Pancreatin (g)	Start Time	End Time	Elapsed Time (min)	Start Temp (°C)	End Temp (°C)	Start Speed (cycles/min)	End Speed (cycles/min)
Acceptance Range	n/a	7.5 ±0.5	0.35	0.035	n/a	n/a	120	37 ±2	37 ±2	30 ±2	30 ±2
621	1.5	7.14	0.1749	0.0174	13:30	15:30	120	37	36	30	30
618	1.5	7.81	0.1748	0.0176	↓	↓	↓	↓	↓	↓	↓
B/BL-3	3.1	7.93	0.3500	0.0346	↓	↓	↓	↓	↓	↓	↓
BL/S-3	—	—	—	—	—	—	—	—	—	—	—
M/S-3	3.1	7.02	0.3502	0.0352	↓	↓	↓	↓	↓	↓	↓
R517	3.0	7.27	0.3498	0.0354	↓	↓	↓	↓	↓	↓	↓
*R565	3.0	7.57	0.3499	0.0353	↓	↓	↓	↓	↓	↓	↓
R561	2.9	7.27	0.3497	0.0354	↓	↓	↓	↓	↓	↓	↓
R560	3.0	7.47	0.3497	0.0346	↓	↓	↓	↓	↓	↓	↓
R529	2.8	7.13	0.3499	0.0346	↓	↓	↓	↓	↓	↓	↓
R530	3.0	7.62	0.3498	0.0351	↓	↓	↓	↓	↓	↓	↓
R550	2.9	7.58	0.3500	0.0346	↓	↓	↓	↓	↓	↓	↓
R502	3.0	7.28	0.3500	0.0351	↓	↓	↓	↓	↓	↓	↓

[a]50% w/w NaOH.

100 mL H_2O + 50g NaOH

Additional Notes:

At completion of the gastric phase, 30 mL was removed for analysis and replaced with fresh gastric extraction fluid.

* may have added 32.5 mL instead of 30 mL.

Gastric fluid samples for soil centrifuged @ 6000 g.

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METALS BIOACCESSIBILITY IN SOILS TESTING – DATA SHEETS

Extraction Fluid Preparation

Date of preparation: Jan. '05/07

Prepared by: TAMMIE MORGAN

Notes:

Extraction Fluid Preparation.

Component	Amount/Value in 1 L	Amount/Value in 2 L	Acceptance Range	Actual Amount/Value
Deionized water	~ 0.8 L	~ 1.8 L	n/a	~1 L
Glycine	30.03 g	60.06 g	n/a	30.03 g + 30.03 g
HCl[abc]	~30 mL	~60 mL	n/a	~60 mL
pH	1.50	1.50	1.45–1.55	1.51
Final volume	1 L	2 L	n/a	2 L

[a]The pH must be adjusted while the solution is at 37 °C.

[b]Concentrated HCl, trace metal grade.

[c]Add concentrated HCl until the solution reaches a pH of 1.50 ±0.05. This will require ~30 mL and ~60 mL for a 1 L and a 2 L solution, respectively. Extraction fluid can be prepared in advance, but the pH must be checked and adjusted if necessary (@ 37 °C!) prior to use.

METALS BIOACCESSIBILITY IN SOILS TESTING – DATA SHEETS

Gastric and Intestinal Phase Extractions

Date of extraction: Jan 06/07

Extracted by: Tammie Morgan

Site soil samples: 04-1112-069 (6000)

Notes:

Gastric Phase Extraction.

Sample	Sample Preparation			Gastric Phase Extraction									
	Mass Pepsin (g)	Volume Gastric Fluid (mL)	Mass Soil (g)	Start Time	End Time	Elapsed Time (min)	Start pH	End pH	Δ pH	Start Temp (°C)	End Temp (°C)	Start Speed (cycles/min)	End Speed (cycles/min)
Acceptance Range	1.00 ±0.05	100 ±0.5	1.00 ±0.05	n/a	n/a	120 ±5	n/a	n/a	1.5 ±0.5	37 ±2	37 ±2	30 ±2	30 ±2
R553	1.0000	100	1.0010	9:54	11:54	120	1.51	1.55	0.04	36	36	30	30
R516	1.0003	↓	0.9996	↓	↓	↓	↓	1.59	0.08	↓	↓	↓	↓
R506	0.9990		0.9994					1.62	0.11				
R582	0.9995		1.0001					1.61	0.10				
R582R	1.0002		0.9991					1.66	0.15				
R554	1.0003		0.9992					1.69	0.13				
R519	0.9995		1.0005					1.68	0.17				
R667	0.9994		1.0012					1.69	0.18				
R533	1.0002		1.0001					1.67	0.16				
R566	1.0001		1.0008					1.67	0.16				
R584	0.9999	↓	1.0004	↓	↓	↓	↓	1.69	0.18	↓	↓	↓	↓

REAGENT BLANK SUBMITTED

Intestinal Phase Extraction.

Sample	Sample Preparation				Intestinal Phase Extraction							2nd pH
	Volume NaOH[a] (mL)	pH	Mass Bile (g)	Mass Pancreatin (g)	Start Time	End Time	Elapsed Time (min)	Start Temp (°C)	End Temp (°C)	Start Speed (cycles/min)	End Speed (cycles/min)	
Acceptance Range	n/a	7.5 ±0.5	0.35	0.035	n/a	n/a	120	37 ±2	37 ±2	30 ±2	30 ±2	
0 R553	3.0	7.27	0.3503	0.0347	13:18	15:18	120	36	36	30	30	7.24
6 R516	3.0	7.14	0.3503	0.0346	↓	↓	↓	↓	↓	↓	↓	6.91
9 R506	3.0	7.44	0.3498	0.0348								7.35
12.1 R562	3.1	7.67	0.3499	0.0351								7.50
15.1 R582R	3.0	7.66	0.3499	0.0352								7.43
18.2 R554	3.1	7.63	0.3502	0.0350								7.43
21.2 R519	3.0	7.53	0.3496	0.0348								7.29
24.3 R607	3.1	7.03	0.3496	0.0349								6.86
7 R533	3.0	7.41	0.3502	0.0348								7.12
7 R566	3.0	7.69	0.3497	0.0349								7.50
10.1 R584	3.1	7.00	0.3498	0.0348	↓	↓	↓	↓	↓	↓	↓	6.91

[a] ~~50%~~ w/w NaOH.
100 mL H_2O + 50g NaOH

Additional Notes:

At completion of gastric phase, 30 mL was removed for analyses and replaced with fresh gastric extraction fluid.

METALS BIOACCESSIBILITY IN SOILS TESTING – DATA SHEETS

Extraction Fluid Preparation

Date of preparation: Jan 26/07

Prepared by: Tammie Morgan

Notes:

Extraction Fluid Preparation.

Component	Amount/Value in 1 L	Amount/Value in 2 L	Acceptance Range	Actual Amount/Value
Deionized water	~ 0.8 L	~ 1.8 L	n/a	~1.6L
Glycine	30.03 g	60.06 g	n/a	30.03g + 30.03g
HCl[abc]	~30 mL	~60 mL	n/a	30mL
pH	1.50	1.50	1.45–1.55	1.50
Final volume	1 L	2 L	n/a	2L

[a]The pH must be adjusted while the solution is at 37 °C.

[b]Concentrated HCl, trace metal grade.

[c]Add concentrated HCl until the solution reaches a pH of 1.50 ±0.05. This will require ~30 mL and ~60 mL for a 1 L and a 2 L solution, respectively. Extraction fluid can be prepared in advance, but the pH must be checked and adjusted if necessary (@ 37 °C!) prior to use.

METALS BIOACCESSIBILITY IN SOILS TESTING – DATA SHEETS

Gastric and Intestinal Phase Extractions

Date of extraction: Jan 07/07

Extracted by: Tammie Morgan

Site soil samples: 04-1112-069(6000)

Notes:

Gastric Phase Extraction.

Sample	Sample Preparation			Gastric Phase Extraction										
	Mass Pepsin (g) ✓	Volume Gastric Fluid (mL)	Mass Soil (g) ✓	Start Time	End Time	Elapsed Time (min)	Start pH	End pH	Δ pH	Start Temp (°C)	End Temp (°C)	Start Speed (cycles/min)	End Speed (cycles/min)	
Acceptance Range	1.00 ±0.05	100 ±0.5	1.00 ±0.05	n/a	n/a	120 ±5	n/a	n/a	1.5 ±0.5	37 ±2	37 ±2	30 ±2	30 ±2	pH
B/BL-4	1.0005	100	—	10:25	12:25	120	1.54	1.67	0.13	37	37	30	30	1.58
BL/S-4	—	100	—	—	—	—		—	—	—	—	—	—	1.56
M/S-4	0.9990	100	—					1.66	0.12					1.56
SRM2711-4	0.9997	100	1.0007					1.81	0.27					1.64
R529	1.0002	100	1.0004					1.75	0.21					1.62
R581	1.0004	100	1.0012					1.80	0.26					1.64
R593	1.0011	100	0.9995					1.79	0.25					1.64
R501	1.0005	100	1.0011					1.78	0.24					1.66
R525	1.0006	100	0.9997					1.79	0.25					1.70
R541	0.9999	100	0.9993					1.78	0.24					1.70
R551	1.0007	100	1.0003					1.79	0.25					1.71

Intestinal Phase Extraction.

	Sample	Sample Preparation				Intestinal Phase Extraction							
		Volume NaOH[a] (mL)	pH	Mass Bile (g)	Mass Pancreatin (g)	Start Time	End Time	Elapsed Time (min)	Start Temp (°C)	End Temp (°C)	Start Speed (cycles/min)	End Speed (cycles/min)	End pH
	Acceptance Range	n/a	7.5 ±0.5	0.35	0.035	n/a	n/a	120	37 ±2	37 ±2	30 ±2	30 ±2	
2.9	B/BL-4	2.9	7.30	0.3501	0.0351	1:44	15:44	120	37	36	30	30	7.26
3 8.9	BL/S-4	/	/	/	/	/	/	/	/	/	/	/	/
2.9 8.8	MS-4	3.0	7.27	0.3499	0.0353	↓	↓	↓	↓	↓		↓	7.24
11.8	SRM2711-4	2.9	7.27	0.3503	0.0356								7.14
	RS34	3.0	7.88	0.3500	0.0350								7.81
14.7	RS81	2.9	7.42	0.3504	0.0348								7.17
17.7	RS93	3.0	7.45	0.3506	0.0352								7.35
20.6	RS01	2.9	7.64	0.3500	0.0348								7.43
3- 5.9	RS25	2.9	7.16	0.3502	0.0355								6.91
8.8	RS91	2.9	7.37	0.351	0.0350								7.14
	RS51	3.0	7.37	0.351	0.0352								7.22

[a] ~~50%~~ w/w NaOH.
100mL H_2O + 50g NaOH

Additional Notes: At completion of gastric phase, 30 mL was removed for analysis and replaced with fresh gastric extraction fluid.

10

METALS BIOACCESSIBILITY IN SOILS TESTING – DATA SHEETS

Extraction Fluid Preparation

Date of preparation: Jan 07/07

Prepared by: Tammie Morgan

Notes:

Extraction Fluid Preparation.

Component	Amount/Value in 1 L	Amount/Value in 2 L	Acceptance Range	Actual Amount/Value
Deionized water	~ 0.8 L	~ 1.8 L	n/a	~1.6L
Glycine	30.03 g	60.06 g	n/a	30.03g + 30.03g
HCl[abc]	~30 mL	~60 mL	n/a	~60mL
pH	1.50	1.50	1.45–1.55	1.50
Final volume	1 L	2 L	n/a	2L

[a]The pH must be adjusted while the solution is at 37 °C.

[b]Concentrated HCl, trace metal grade.

[c]Add concentrated HCl until the solution reaches a pH of 1.50 ±0.05. This will require ~30 mL and ~60 mL for a 1 L and a 2 L solution, respectively. Extraction fluid can be prepared in advance, but the pH must be checked and adjusted if necessary (@ 37 °C!) prior to use.

METALS BIOACCESSIBILITY IN SOILS TESTING – DATA SHEETS

Gastric and Intestinal Phase Extractions

Date of extraction: Jan 08/07

Extracted by: Tammie Morgan

Site soil samples: 04-1112-069 (6000)

Notes:

Gastric Phase Extraction.

Sample	Sample Preparation			Gastric Phase Extraction										
	Mass Pepsin (g)	Volume Gastric Fluid (mL)	Mass Soil (g)	Start Time	End Time	Elapsed Time (min)	Start pH	End pH	Δ pH	Start Temp (°C)	End Temp (°C)	Start Speed (cycles/min)	End Speed (cycles/min)	
Acceptance Range	1.00 ±0.05	100 ±0.5	1.00 ±0.05	n/a	n/a	120 ±5	n/a	n/a	1.5 ±0.5	37 ±2	37 ±2	30 ±2	30 ±2	pH
R599	1.0003	100	1.0002	10:09	12:09	120	1.51	1.58	0.07	38	37	30	30	1.54
R599R	0.9997	100	1.0009	↓	↓	↓	↓	1.64	0.13	↓	↓	↓	↓	1.53
R602	1.0010	100	0.9997	↓	↓	↓	↓	1.65	0.14	↓	↓	↓	↓	1.54
R526	1.0012	100	0.9994	↓	↓	↓	↓	1.66	0.15	↓	↓	↓	↓	1.54
R514	1.0013	100	1.0001	↓	↓	↓	↓	1.68	0.17	↓	↓	↓	↓	1.57
R523	1.0002	100	0.9990	↓	↓	↓	↓	1.68	0.17	↓	↓	↓	↓	1.57
R531	1.0002	100	0.9996	↓	↓	↓	↓	1.67	0.16	↓	↓	↓	↓	1.58
R563	1.0001	100	0.9999	↓	↓	↓	↓	1.70	0.19	↓	↓	↓	↓	1.58
R596	1.0012	100	1.0009	↓	↓	↓	↓	1.71	0.20	↓	↓	↓	↓	1.60

Intestinal Phase Extraction.

Sample	Sample Preparation				Intestinal Phase Extraction						
	Volume NaOH[a] (mL)	pH	Mass Bile (g)	Mass Pancreatin (g)	Start Time	End Time	Elapsed Time (min)	Start Temp (°C)	End Temp (°C)	Start Speed (cycles/min)	End Speed (cycles/min)
Acceptance Range	n/a	7.5 ±0.5	0.35	0.035	n/a	n/a	120	37 ±2	37 ±2	30 ±2	30 ±2
2.9 R599	2.9	7.21	0.3507	0.0350	13:20	15:20	120	37	36	30	30
8.9 R599R	3.0	7.57	0.3507	0.0355	↓	↓	↓	↓	↓	↓	↓
8.9 R602	3.0	7.38	0.3505	0.0354							
11.9 R526	3.0	7.62	0.3500	0.0352							
14.9 R514	3.0	7.61	0.3500	0.0352							
17.9 R523	3.0	7.56	0.3504	0.0353							
20.9 R531	3.0	7.34	0.3506	0.0353							
3.1 R563	3.1	7.68	0.3501	0.0352							
6.1 R596	3.0	7.55	0.3512	0.0350							

end pH
6.86
7.37
7.24
7.44
7.33
7.33
7.04
7.50
7.29

[a] ~~50%~~ w/w NaOH.

100mL H_2O + 50g NaOH

Additional Notes:

At completion of the gastric phase, 30mL was removed & replaced with 30mL of fresh gastric solution.

CHAIN OF CUSTODY RECORDS

CHAIN OF CUSTODY RECORD

AGAT Laboratories Limited
5623 McAdam Road
Mississauga, Ontario L4Z 1N9
http://webearth.agatlabs.com

Phone: 905-501-9998
Fax: 905-501-0589
Toll free: 800-856-6261
www.agatlabs.com

LABORATORY USE ONLY
Arrival Condition: ☐ Good ☐ Poor (complete "notes")
Arrival Temperature: _____
AGAT Job Number: OCT 2015 92
Notes: _____

Client Information

Company: GOLDER ASSOCIATES
Contact: TAMMIE MORGAN
Address: 2390 ARGENTIA RD.
MISSISSAUGA ON
Phone: ~~905-567-1600~~ Fax: ~~905-567-1650~~
PO #: _____
Client Project #: 04-1112-0169 (6000)
AGAT Quotation #: _____

Report Information - reports to be sent to:

1. Name: TAMMIE MORGAN
Email: tmorgan@golder.com
2. Name: _____
Email: _____
3. Name: _____
Email: _____

Notes (i.e. billing, sub-sampling requirements etc.)
Fluid samples are time sensitive - must be analyzed within 7 days of submission to lab.

Report Format

☐ Single Sample per page
☒ Multiple Samples per page
☐ Results by Fax

Turnaround Time (TAT) Required*

Regular TAT:
☒ 5 to 7 Working Days
Rush TAT: **(please provide prior notification)**
Rush Surcharges Apply
☐ 3 to 5 days
☐ 48 to 72 Hours
☐ 24 to 48 hours
OR
DATE REQUIRED (Rush surcharges may apply): _____

Regulatory Guideline Required

☐ Reg 153 Table ____ (Indicate one)
☐ Ind/Com ☐ Res/Park ☐ Ag
☐ Med/Fine ☐ Coarse
☐ Sewer Use
Region _____ (Indicate one)
☐ Sanitary ☐ Storm
☐ PWQO ☐ Reg 558 ☐ CCME ☐ Other (Indicate)

Is this a drinking water sample (potable water intended for human consumption)?
☐ Yes ☒ No
If "Yes" please use the Drinking Water Chain of Custody Record

Sample Identification	Date Sampled	Time Sampled	Sample Matrix	# of Containers	Comments: Site/Sample Information	Metals Scan (incl. Hg, B, Cr6)	Metals Scan (not incl. Hg, B, Cr6)	CCME Fractions 1 to 4	VOCs	PAHs	PCBs	TCLP metals/inorganics	TCLP	Storm Sewer Use	Sanitary Sewer Use
517-G	15/12/06	12:00	Fluid	1			✓								
521-G				1			✓								
565-G				1			✓								
561-G				1			✓								
560-G				1			✓								
529-G				1			✓								
530-G				1			✓								
550-G				1			✓								
500-G				1			✓								
553-G				1			✓								
TOTAL # OF CONTAINERS															

*Samples received after 2:00 PM will be logged in for the next business day. TAT is exclusive of weekends and statutory holidays

Samples Relinquished By (print name & sign)	Date/Time	Samples Received By (print name & sign)	Date/Time
TAMMIE MORGAN	15/12/06 17:50		
Samples Relinquished By (print name & sign)	Date/Time	Samples Received By (print name & sign)	Date/Time

Pink Copy – Client
Yellow Copy - AGAT
White Copy - AGAT

NO: 49185

CHAIN OF CUSTODY RECORD

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Phone: 905-501-9998
Fax: 905-501-0589
Toll free: 800-856-6261
www.agatlabs.com

LABORATORY USE ONLY
Arrival Condition: ☐ Good ☐ Poor (complete "notes")
Arrival Temperature:
AGAT Job Number: 06T201592
Notes:

Client Information

Company: GOLDER ASSOCIATES
Contact: TAMMIE MORGAN
Address: 2390 ARGENTIA RD. MISSISSAUGA
Phone: 905-567-1100 Fax: 905-567 6561
PO #:
Client Project #: 04-1112-069 (60000)
AGAT Quotation #:

Report Information - reports to be sent to:

1. Name: TAMMIE MORGAN
Email: tmorgan@golder.com
2. Name:
Email:
3. Name:
Email:

Notes (i.e. billing, sub-sampling requirements etc.)
Fluid samples are time sensitive- must be analyzed within 7 days of submission to lab.

Report Format
☐ Single Sample per page
☒ Multiple Samples per page
☐ Results by Fax

Turnaround Time (TAT) Required*

Regular TAT:
☒ 5 to 7 Working Days
Rush TAT: (please provide prior notification)
Rush Surcharges Apply
☐ 3 to 5 days
☐ 48 to 72 Hours
☐ 24 to 48 hours
OR
DATE REQUIRED (Rush surcharges may apply):

Regulatory Guideline Required

☐ Reg 153 Table ____ (Indicate one) ☐ Ind/Com ☐ Res/Park ☐ Ag
☐ Sewer Use Region ____ (Indicate one) ☐ Sanitary ☐ Storm
☐ PWQO ☐ Reg 558 ☐ CCME ☐ Other (indicate)
☐ Med/Fine ☐ Coarse

Is this a drinking water sample (potable water intended for human consumption)? ☐ Yes ☒ No
If "Yes" please use the Drinking Water Chain of Custody Record

Sample Identification	Date Sampled	Time Sampled	Sample Matrix	# of Containers	Comments Site/ Sample Information	Metals Scan (not incl. Hg, B, Cr6)	CCME Fractions (F1-F4)	VOCs	PAHs	PCBs	TCLP Metals/Inorganics	TCLP	Storm Sewer Use	Sanitary Sewer Use
517 - I	15/12/06	16:00	fluid	1		✓								
521 - I				1		✓								
565 - I				1		✓								
561 - I				1		✓								
560 - I				1		✓								
529 - I				1		✓								
530 - I				1		✓								
552 - I				1		✓								
502 - I				1		✓								
553 - I				1		✓								
R/BL - 1	↓	↓	↓	1		✓								
TOTAL # OF CONTAINERS														

*Samples received after 2:00 PM will be logged in for the next business day. TAT is exclusive of weekends and statutory holidays

Samples Relinquished By (print name & sign)	Date/Time	Samples Received By (print name & sign)	Date/Time
TAMMIE MORGAN Tammie Morgan	15/12/06 12:00		
Samples Relinquished By (print name & sign)	Date/Time	Samples Received By (print name & sign)	Date/Time

Pink Copy – Client
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White Copy - AGAT

NO: 49176

CHAIN OF CUSTODY RECORD

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Fax: 905-501-0589
Toll free: 800-856-6261
www.agatlabs.com

LABORATORY USE ONLY
Arrival Condition: ☐ Good ☐ Poor (complete "notes")
Arrival Temperature: _____
AGAT Job Number: _____
Notes: _____

Client Information

Company: Golder Associates
Contact: Tammie Morgan
Address: 2390 Argentia Rd.

Phone: 905-567-6100 Fax: 905-567-6561
PO #:
Client Project #: 04-1112-069 (6000)
AGAT Quotation #:

Report Information - reports to be sent to:

1. Name: Tammie Morgan
Email: tmorgan@golder.com
2. Name:
Email:
3. Name:
Email:

Notes (i.e. billing, sub-sampling requirements etc.)
Fluid samples are time sensitive - must be analyzed within 7 days of sample date.

Report Format

☐ Single Sample per page
☒ Multiple Samples per page
☐ Results by Fax

Turnaround Time (TAT) Required*

Regular TAT:
☒ 5 to 7 Working Days
Rush TAT: (please provide prior notification)
Rush Surcharges Apply
☐ 3 to 5 days
☐ 48 to 72 Hours
☐ 24 to 48 hours
OR
DATE REQUIRED (Rush surcharges may apply):

Regulatory Guideline Required

☐ Reg 153 Table ____ (Indicate one) ☐ Ind/Com ☐ Res/Park ☐ Ag ☐ Med/Fine ☐ Coarse
☐ Sewer Use Region ____ (Indicate one) ☐ Sanitary ☐ Storm
☐ PWQO ☐ Reg 558 ☐ CCME ☐ Other (indicate) ____

Is this a drinking water sample (potable water intended for human consumption)?
☐ Yes ☒ No
If "Yes" please use the Drinking Water Chain of Custody Record

Sample Identification	Date Sampled	Time Sampled	Sample Matrix	# of Containers	Comments Site/Sample Information	Metals and Inorganics	Metals Scan (not incl. Hg, B, Cr6)	CCME Fractions F1-F4	VOCs	PAHs	PCBs	Total Metals/Inorganics	TCLP	Storm Sewer Use	Sanitary Sewer Use
516-I	18/12/06	15:34	fluid	1			✓								
506-I				1			✓								
552-I				1			✓								
552R-I				1			✓								
554-I				1			✓								
519-I				1			✓								
507-I				1			✓								
533-I				1			✓								
566-I				1			✓								
584-I				1			✓								
TOTAL # OF CONTAINERS															

*Samples received after 2:00 PM will be logged in for the next business day. TAT is exclusive of weekends and statutory holidays

Samples Relinquished By (print name & sign)	Date/Time	Samples Received By (print name & sign)	Date/Time
Tammie Morgan	18/12/06		
Samples Relinquished By (print name & sign)	Date/Time	Samples Received By (print name & sign)	Date/Time
	17:00		

Pink Copy – Client
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NO: 49174

FS

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Fax: 905-501-0589
Toll free: 800-856-6261
www.agatlabs.com

LABORATORY USE ONLY
Arrival Condition: ☑ Good ☐ Poor (complete "notes")
Arrival Temperature: 17°c
AGAT Job Number: 06T 201953
Notes:

Client Information
Company: Golder Associates
Contact: Tammie Morgan
Address: 2390 Argentia Rd.
Mississauga
Phone: 905-567-6100 Fax: 905-567-6561
PO #:
Client Project #: 04-1112-064 (6000)
AGAT Quotation #:

Report Information - reports to be sent to:
1. Name: Tammie Morgan
Email: tmorgan@golder.com
2. Name:
Email:
3. Name:
Email:

Notes (i.e. billing, sub-sampling requirements etc.)
fluid samples are time sensitive - must be analyzed within 7 days of sample date.

Report Format
☐ Single Sample per page
☒ Multiple Samples per page
☐ Results by Fax

Turnaround Time (TAT) Required*
Regular TAT:
☒ 5 to 7 Working Days
Rush TAT: (please provide prior notification)
Rush Surcharges Apply
☐ 3 to 5 days
☐ 48 to 72 Hours
☐ 24 to 48 hours
OR
DATE REQUIRED (Rush surcharges may apply):

Regulatory Guideline Required
☐ Reg 153 Table ____ (Indicate one)
☐ Ind/Com
☐ Res/Park
☐ Ag
☐ Med/Fine ☐ Coarse
☐ Sewer Use
Region ____ (Indicate one)
☐ Sanitary
☐ Storm
☐ PWQO
☐ Reg 558
☐ CCME
☐ Other (indicate)

Is this a drinking water sample (potable water intended for human consumption)?
☐ Yes ☒ No
If "Yes" please use the Drinking Water Chain of Custody Record

Sample Identification	Date Sampled	Time Sampled	Sample Matrix	# of Containers	Comments Site/ Sample Information	Metals and Inorganics	Metals Scan (not incl. Hg, B, Cr6)	CCME Fractions 1 to 4	VOCs	PAHs	PCBs	TCLP Metals/Inorganics	TCLP ___	Storm Sewer Use	Sanitary Sewer Use									
SRM2711-S	19/12/06	9:33	Soil				✓																	
534-S	↓	↓	↓	↓			✓																	
581-S	↓	↓	↓	↓			✓																	
593-S	↓	↓	↓	↓			✓																	
501-S	↓	↓	↓	↓			✓																	
525-S	↓	↓	↓	↓			✓																	
541-S	↓	↓	↓	↓			✓																	
551-S	↓	↓	↓	↓			✓																	

TOTAL # OF CONTAINERS

*Samples received after 2:00 PM will be logged in for the next business day. TAT is exclusive of weekends and statutory holidays.

Samples Relinquished By (print name & sign)	Date/Time	Samples Received By (print name & sign)	Date/Time
Tammie Morgan / Tammie Morgan	19/12/06 17:10	Jason Dec.19/06	17:10
		Julian Kuok Dec 19	5:45

Pink Copy - Client
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PAGE 1 of 3

NO: 49175

F5

CHAIN OF CUSTODY RECORD

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Mississauga, Ontario L4Z 1N9
http://webearth.agatlabs.com

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Fax: 905-501-0589
Toll free: 800-856-6261
www.agatlabs.com

LABORATORY USE ONLY
Arrival Condition: ☑ Good ☐ Poor (complete "notes")
Arrival Temperature: 12°C
AGAT Job Number: OGT 201953
Notes:

Client Information

Company: GOLDER ASSOCIATES
Contact: TAMMIE MORGAN
Address: 2390 ARGENTIA RD.
MISSISSAUGA
Phone: 905-567-6100 Fax: 905-567-6561
PO #:
Client Project #: 04-1112-0169 (6000)
AGAT Quotation #:

Report Information - reports to be sent to:

1. Name: TAMMIE MORGAN
Email: tmorgan@golder.com
2. Name:
Email:
3. Name:
Email:

Notes (j.e. billing, sub-sampling requirements etc.):
Fluid samples are time sensitive- must be analyzed within 7 days of sampling date.

Report Format

☐ Single Sample per page
☑ Multiple Samples per page
☐ Results by Fax

Turnaround Time (TAT) Required*

Regular TAT:
☑ 5 to 7 Working Days
Rush TAT: (please provide prior notification)
Rush Surcharges Apply
☐ 3 to 5 days
☐ 48 to 72 Hours
☐ 24 to 48 hours
OR
DATE REQUIRED (Rush surcharges may apply):

Regulatory Guideline Required

☐ Reg 153 Table ____ (Indicate one) ☐ Ind/Com ☐ Res/Park ☐ Ag ☐ Med/Fine ☐ Coarse
☐ Sewer Use Region ____ (Indicate one) ☐ Sanitary ☐ Storm
☐ PWQO ☐ Reg 558 ☐ CCME ☐ Other (indicate)

Is this a drinking water sample (potable water intended for human consumption)? ☐ Yes ☑ No
If "Yes" please use the Drinking Water Chain of Custody Record

Sample Identification	Date Sampled	Time Sampled	Sample Matrix	# of Containers	Comments/ Site/ Sample Information	Metals Scan (not incl. Hg, B, Cr6)	VOCs	PAHs	PCBs	TCLP	Sanitary Sewer Use	TAL	
B/BL-G	12/12/06	11:33	FLUID	1		✓							
BL/S						✓							
M/S-G						✓							
SBM-2711-G						✓							
534-G						✓							
561-G						✓							
543-G						✓							
501-G						✓							
525-G						✓							
541-G						✓							
551-G						✓							
TOTAL # OF CONTAINERS													

*Samples received after 2:00 PM will be logged in for the next business day. TAT is exclusive of weekends and statutory holidays

Samples Relinquished By (print name & sign)	Date/Time	Samples Received By (print name & sign)	Date/Time
TAMMIE MORGAN Tammie Morgan	12/12/06	Dec.19/06 17:00	17:10

Pink Copy – Client
Yellow Copy - AGAT
White Copy - AGAT

NO: 49177

CHAIN OF CUSTODY RECORD

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Mississauga, Ontario L4Z 1N9
http://webearth.agatlabs.com

Phone: 905-501-9998
Fax: 905-501-0589
Toll free: 800-856-6261
www.agatlabs.com

LABORATORY USE ONLY
Arrival Condition: ☑ Good ☐ Poor (complete "notes")
Arrival Temperature:
AGAT Job Number: CCT 301 953
Notes:

Client Information

Company: GOLDER ASSOCIATES
Contact: TAMMIE MORGAN
Address: 2390 ARGENTIA RD.
MISSISSAUGA
Phone: 905-567-6100 Fax: 905-567-6561
PO #:
Client Project #: 04-1112-069 (6000)
AGAT Quotation #:

Report Information - reports to be sent to:

1. Name: TAMMIE MORGAN
Email: tmorgan@golder.com
2. Name:
Email:
3. Name:
Email:

Notes (i.e. billing, sub-sampling requirements etc.)
Fluid samples are time sensitive- must be analyzed within 7 days of sampling date.

Report Format

☐ Single Sample per page
☒ Multiple Samples per page
☐ Results by Fax

Turnaround Time (TAT) Required*

Regular TAT:
☒ 5 to 7 Working Days
Rush TAT: (please provide prior notification)
Rush Surcharges Apply
☐ 3 to 5 days
☐ 48 to 72 Hours
☐ 24 to 48 hours
OR
DATE REQUIRED (Rush surcharges may apply):

Regulatory Guideline Required

☐ Reg 153 Table ____ (Indicate one)
☐ Ind/Com ☐ Res/Park ☐ Ag
☐ Med/Fine ☐ Coarse
☐ Sewer Use
Region ____ (Indicate one)
☐ Sanitary ☐ Storm
☐ PWQO ☐ Reg 558 ☐ CCME ☐ Other (indicate)

Is this a drinking water sample (potable water intended for human consumption)?
☐ Yes ☒ No
If "Yes" please use the Drinking Water Chain of Custody Record

Sample Identification	Date Sampled	Time Sampled	Sample Matrix	# of Containers	Comments / Site/ Sample Information	Metals and Inorganics	Metals Scan (not incl. Hg, 6, Cr6)	CCME Fractions 1 to 4	VOCs	PAHs	PCBs	TCLP Metals/Inorganics	TCLP	Storm Sewer Use	Sanitary Sewer Use
B/BL-I	19/12/06	14:51	FLUID	1			✓								
M/S-I							✓								
SRM2711-I							✓								
534-I							✓								
551-I							✓								
543-I							✓								
501-I							✓								
525-I							✓								
541-I							✓								
551-I	↓	↓	↓	↓			✓								

TOTAL # OF CONTAINERS

*Samples received after 2:00 PM will be logged in for the next business day. TAT is exclusive of weekends and statutory holidays

Samples Relinquished By (print name & sign)	Date/Time	Samples Received By (print name & sign)	Date/Time
TAMMIE MORGAN / Tammie Morgan	19/12/06	Dec. 19/06	17:10
Samples Relinquished By (print name & sign)	Date/Time	Samples Received By (print name & sign)	Date/Time

Pink Copy – Client
Yellow Copy - AGAT
White Copy - AGAT

PAGE 3 of 3
NO: 49178

CHAIN OF CUSTODY RECORD

AGAT Laboratories Limited
5623 McAdam Road
Mississauga, Ontario L4Z 1N9
http://webearth.agatlabs.com

Phone: 905-501-9998
Fax: 905-501-0589
Toll free: 800-856-6261
www.agatlabs.com

Fr 14°

LABORATORY USE ONLY
Arrival Condition: ☐ Good ☐ Poor (complete "notes")
Arrival Temperature: _____
AGAT Job Number: 06T 202297
Notes: _____

Client Information

Company: GOLDER ASSOCIATES
Contact: TAMMIE MORGAN
Address: 2390 ARGENTIA RD.
MISSISSAUGA
Phone: 905-567-6100 Fax: 905-567-6561
PO #: _____
Client Project #: 04-1112-067 (10000)
AGAT Quotation #: _____

Report Information - reports to be sent to:

1. Name: TAMMIE MORGAN
Email: tmorgan@golder.com
2. Name: _____
Email: _____
3. Name: _____
Email: _____

Notes (i.e. billing, sub-sampling requirements etc.)
Fluid samples are time sensitive - must be analyzed within 7 days of sampling date.

Report Format

☐ Single Sample per page
☒ Multiple Samples per page
☐ Results by Fax

Turnaround Time (TAT) Required*

Regular TAT:
☒ 5 to 7 Working Days
Rush TAT: (please provide prior notification)
Rush Surcharges Apply
☐ 3 to 5 days
☐ 48 to 72 Hours
☐ 24 to 48 hours
OR
DATE REQUIRED (Rush surcharges may apply): _____

Regulatory Guideline Required

☐ Reg 153 Table ____ (Indicate one)
☐ Ind/Com ☐ Res/Park ☐ Ag
☐ Med/Fine ☐ Coarse
☐ Sewer Use
Region _____ (Indicate one)
☐ Sanitary ☐ Storm
☐ PWQO ☐ Reg 558 ☐ CCME ☐ Other (indicate)

Is this a drinking water sample (potable water intended for human consumption)?
☐ Yes ☒ No
If "Yes" please use the Drinking Water Chain of Custody Record

Sample Identification	Date Sampled	Time Sampled	Sample Matrix	# of Containers	Comments Site/Sample Information	Metals and Inorganics	Metals Scan (not incl. Hg, B, Cr6)	CCME Fractions 1 to 4	VOCs	PAHs	PCBs	TCLP Metals/Inorganics	TCLP	Storm Sewer Use	Sanitary Sewer Use
599-S	20/12/06	9:58	Soil	1			✓								
599R-S							✓								
602-S							✓								
526-S							✓								
514-S							✓								
523-S							✓								
531-S							✓								
520-S							✓								
513-S							✓								
516-S							✓								
TOTAL # OF CONTAINERS				10											

*Samples received after 2:00 PM will be logged in for the next business day. TAT is exclusive of weekends and statutory holidays

Samples Relinquished By (print name & sign)	Date/Time	Samples Received By (print name & sign)	Date/Time
TAMMIE MORGAN	20/12/06 17:00	Dave Harrison	Dec 21 9:15
Samples Relinquished By (print name & sign)	Date/Time	Samples Received By (print name & sign)	Date/Time

Pink Copy - Client
Yellow Copy - AGAT
White Copy - AGAT

NO: 49179

CHAIN OF CUSTODY RECORD

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5623 McAdam Road
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Phone: 905-501-9998
Fax: 905-501-0589
Toll free: 800-856-6261
www.agatlabs.com

LABORATORY USE ONLY
Arrival Condition: ☐ Good ☐ Poor (complete "notes")
Arrival Temperature: _____
AGAT Job Number: _____
Notes: _____

Client Information

Company: GOLDER ASSOCIATES
Contact: TAMMIE MORGAN
Address: 2390 ARGENTIA RD.
MISSISSAUGA
Phone: 905-567-1200 Fax: 905-567-6561
PO #: _____
Client Project #: 04-1112-069 (6000)
AGAT Quotation #: _____

Report Information - reports to be sent to:

1. Name: TAMMIE MORGAN
Email: tmorgan@golder.com
2. Name: _____
Email: _____
3. Name: _____
Email: _____

Notes (i.e. billing, sub-sampling requirements etc.)
fluid samples are time sensitive - must be analyzed within 7 days of sampling date.

Report Format

☐ Single Sample per page
☒ Multiple Samples per page
☐ Results by Fax

Turnaround Time (TAT) Required*

Regular TAT:
☒ 5 to 7 Working Days
Rush TAT: (please provide prior notification)
Rush Surcharges Apply
☐ 3 to 5 days
☐ 48 to 72 Hours
☐ 24 to 48 hours
OR
DATE REQUIRED (Rush surcharges may apply): _____

Regulatory Guideline Required

☐ Reg 153 Table ____ (Indicate one)
☐ Ind/Com ☐ Res/Park ☐ Ag
☐ Med/Fine ☐ Coarse
☐ Sewer Use
Region _____ (Indicate one)
☐ Sanitary ☐ Storm
☐ PWQO ☐ Reg 558 ☐ CCME ☐ Other (indicate) _____

Is this a drinking water sample (potable water intended for human consumption)?
☐ Yes ☒ No
If "Yes" please use the Drinking Water Chain of Custody Record

Sample Identification	Date Sampled	Time Sampled	Sample Matrix	# of Containers	Comments Site/Sample Information	Metals and Inorganics	Metals Scan (not Ind. Hg, B, Cr6)	CCME Fractions F1 to F4	VOCs	PAHs	PCBs	CLP Metals / Inorganics	TCLP	Storm Sewer Use	Sanitary Sewer Use
599-G	20/12/06	10:58	Fluid	1			✓								
599R-G							✓								
600-G							✓								
506-G							✓								
514-G							✓								
523-G							✓								
531-G							✓								
520-G							✓								
563-G							✓								
596-G							✓								
R/BL-2							✓								
TOTAL # OF CONTAINERS				11											

*Samples received after 2:00 PM will be logged in for the next business day. TAT is exclusive of weekends and statutory holidays

Samples Relinquished By (print name & sign)	Date/Time	Samples Received By (print name & sign)	Date/Time
TAMMIE MORGAN / Tammie Morgan	20/12/06 17:00	D. Harrison	Dec 21 10:15
Samples Relinquished By (print name & sign)	Date/Time	Samples Received By (print name & sign)	Date/Time

Pink Copy – Client
Yellow Copy - AGAT
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NO: 49180

CHAIN OF CUSTODY RECORD

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Phone: 905-501-9998
Fax: 905-501-0589
Toll free: 800-856-6261
www.agatlabs.com

LABORATORY USE ONLY
Arrival Condition: ☐ Good ☐ Poor (complete "notes")
Arrival Temperature: _____
AGAT Job Number: _____
Notes: _____

Client Information

Company: GOLDER ASSOCIATES
Contact: TAMMIE MORGAN
Address: 2390 ARGENTIA RD.
MISSISSAUGA
Phone: 905-567-1600 Fax: 905 567-6561
PO #: _____
Client Project #: 04-1112-0169 (60000)
AGAT Quotation #: _____

Report Information - reports to be sent to:

1. Name: TAMMIE MORGAN
Email: TMORGAN@golder.com
2. Name: _____
Email: _____
3. Name: _____
Email: _____

Notes (i.e. billing, sub-sampling requirements etc.)
Fluid samples are time sensitive - must be analyzed within 7 days of sampling date.

Report Format

☐ Single Sample per page
☒ Multiple Samples per page
☐ Results by Fax

Turnaround Time (TAT) Required*

Regular TAT:
☒ 5 to 7 Working Days
Rush TAT: (please provide prior notification)
Rush Surcharges Apply
☐ 3 to 5 days
☐ 48 to 72 Hours
☐ 24 to 48 hours
OR
DATE REQUIRED (Rush surcharges may apply): _____

Regulatory Guideline Required

☐ Reg 153 Table _____ (Indicate one) ☐ Ind/Com ☐ Res/Park ☐ Ag
☐ Sewer Use — Region _____ (Indicate one) ☐ Sanitary ☐ Storm
☐ PWQO ☐ Reg 558 ☐ CCME ☐ Other (indicate)
☐ Med/Fine ☐ Coarse

Is this a drinking water sample (potable water intended for human consumption)?
☐ Yes ☒ No
If "Yes" please use the Drinking Water Chain of Custody Record

Sample Identification	Date Sampled	Time Sampled	Sample Matrix	# of Containers	Comments Site/ Sample Information	Metals and Inorganics	Metals Scan (not incl. Hg, B, Cr6)	CCME Fractions 1 to 4	VOCs	PAHs	PCBs	TCLP Metals/ Inorganics	TCLP	Storm Sewer Use	Sanitary Sewer Use
599-I	20/12/06	14:07	Fluid	1			✓								
599R-I	↓	↓	↓	↓			✓								
609-I							✓								
526-I							✓								
514-I							✓								
528-I							✓								
531-I							✓								
520-I							✓								
563-I							✓								
596-I	↓	↓	↓	↓			✓								

TOTAL # OF CONTAINERS 10

*Samples received after 2:00 PM will be logged in for the next business day. TAT is exclusive of weekends and statutory holidays

Samples Relinquished By (print name & sign)	Date/Time	Samples Received By (print name & sign)	Date/Time
TAMMIE MORGAN Tammie Morgan	20/12/06 17:00	D. Harrison	Dec 21 10:15
Samples Relinquished By (print name & sign)	Date/Time	Samples Received By (print name & sign)	Date/Time

Pink Copy - Client
Yellow Copy - AGAT
White Copy - AGAT

NO: 49181

F

CHAIN OF CUSTODY RECORD

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Mississauga, Ontario L4Z 1N9
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Phone: 905-501-9998
Fax: 905-501-0589
Toll free: 800-856-6261
www.agatlabs.com

LABORATORY USE ONLY
Arrival Condition: ☐ Good ☐ Poor (complete "notes")
Arrival Temperature: 10°C
AGAT Job Number: 07T 203574
Notes:

Client Information

Company: BOUNTY ASSOCIATES
Contact: TAMMIE MORGAN
Address: 2390 ARGENTIA RD.
MISSISSAUGA
Phone: 905-567-4444 Fax: 905-567-6561
PO #:
Client Project #: 04-1117-069 (6000)
AGAT Quotation #:

Report Information - reports to be sent to:

1. Name: TAMMIE MORGAN
Email: tmorgane golder.com
2. Name:
Email:
3. Name:
Email:

Notes (i.e. billing, sub-sampling requirements etc.)
Fluid samples are time sensitive - must be analyzed within 7 days of sample date.

Report Format
☐ Single Sample per page
☒ Multiple Samples per page
☐ Results by Fax

Turnaround Time (TAT) Required*

Regular TAT:
☒ 5 to 7 Working Days
Rush TAT: (please provide prior notification)
Rush Surcharges Apply
☐ 3 to 5 days
☐ 48 to 72 Hours
☐ 24 to 48 hours
OR
DATE REQUIRED (Rush surcharges may apply):

Regulatory Guideline Required

☐ Reg 153 Table ____ (Indicate one) ☐ Ind/Com ☐ Res/Park ☐ Ag ☐ Med/Fine ☐ Coarse
☐ Sewer Use Region ____ (Indicate one) ☐ Sanitary ☐ Storm
☐ PWQO ☐ Reg 558 ☐ CCME ☐ Other (indicate) ____

Is this a drinking water sample (potable water intended for human consumption)?
☐ Yes ☒ No
If "Yes" please use the Drinking Water Chain of Custody Record

Sample Identification	Date Sampled	Time Sampled	Sample Matrix	# of Containers	Comments Site/ Sample Information	Metals and Inorganics	Metals Scan (not incl. Hg, B, Cr6)	CCME Fractions 1 to 4	VOCs	PAHs	PCBs	TCLP Metals/Inorganics	TCLP	Storm Sewer Use	Sanitary Sewer Use
SRM-5711-2-S	03/01/07	10:12	Soil	1			✓								
570-S							✓								
570R-S							✓								
511-S							✓								
511R-S							✓								
510-S							✓								
513-S							✓								
TOTAL # OF CONTAINERS				7											

*Samples received after 2:00 PM will be logged in for the next business day. TAT is exclusive of weekends and statutory holidays.

Samples Relinquished By (print name & sign)	Date/Time	Samples Received By (print name & sign)	Date/Time
TAMMIE MORGAN	03/01/07 1700	Jan. 04/07	09:30
Samples Relinquished By (print name & sign)	Date/Time	Samples Received By (print name & sign)	Date/Time
			09:50

Pink Copy – Client
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NO: 49183

CHAIN OF CUSTODY RECORD

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Fax: 905-501-0589
Toll free: 800-856-6261
www.agatlabs.com

F7

LABORATORY USE ONLY
Arrival Condition: ☐ Good ☐ Poor (complete "notes")
Arrival Temperature: 10°C
AGAT Job Number: 07T 203574
Notes:

Client Information
Company: Golder Associates
Contact: Tammie Morgan
Address: 2390 Argentia Rd.
Mississauga
Phone: 905-567-4444 Fax: 905-567-6561
PO #:
Client Project #: 04-1112-069 (6000)
AGAT Quotation #:

Report Information - reports to be sent to:
1. Name: Tammie Morgan
Email: tmorgan@golder.com
2. Name:
Email:
3. Name:
Email:

Notes (i.e. billing, sub-sampling requirements etc.)
Fluid samples are time sensitive - must be analyzed within 7 days of sample date.

Report Format
☐ Single Sample per page
☒ Multiple Samples per page
☐ Results by Fax

Turnaround Time (TAT) Required*
Regular TAT:
☒ 5 to 7 Working Days
Rush TAT: (please provide prior notification)
Rush Surcharges Apply
☐ 3 to 5 days
☐ 48 to 72 Hours
☐ 24 to 48 hours
OR
DATE REQUIRED (Rush surcharges may apply):

Regulatory Guideline Required
☐ Reg 153 Table ____ (Indicate one)
☐ Ind/Com
☐ Res/Park
☐ Ag
☐ Med/Fine ☐ Coarse
☐ Sewer Use
Region ____ (Indicate one)
☐ Sanitary
☐ Storm
☐ PWQO
☐ Reg 558
☐ CCME
☐ Other (indicate)

Is this a drinking water sample (potable water intended for human consumption)?
☐ Yes ☒ No
If "Yes" please use the Drinking Water Chain of Custody Record

Sample Identification	Date Sampled	Time Sampled	Sample Matrix	# of Containers	Comments Site/ Sample Information	Metals and Inorganics	Metals Scan (not incl. Hg, B, Cr6)	CCME Fractions 1 to 4	VOCs	PAHs	PCBs	TCLP Metals/Inorganics	TCLP ___	Storm Sewer Use	Sanitary Sewer Use
B/BL-2-G	03/01/07	11:46	Fluid	1			✓								
BL/S-2	↓	↓	↓	↓			✓								
M/S-2-G							✓								
SRM2711-2-G							✓								
570-G							✓								
570R-G							✓								
511-G							✓								
511R-G							✓								
512-G							✓								
513-G	↓	↓	↓	↓			✓								

TOTAL # OF CONTAINERS 10

*Samples received after 2:00 PM will be logged in for the next business day. TAT is exclusive of weekends and statutory holidays.

Samples Relinquished By (print name & sign)	Date/Time	Samples Received By (print name & sign)	Date/Time
Tammie Morgan / [signature]	03/01/07 17:00	[signature] Jan. 04/07	09:30
		[signature]	09:50

Pink Copy – Client
Yellow Copy - AGAT
White Copy - AGAT

PAGE 2 of 3

NO: 49182

CHAIN OF CUSTODY RECORD

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Fax: 905-501-0589
Toll free: 800-856-6261
www.agatlabs.com

LABORATORY USE ONLY
Arrival Condition: ☐ Good ☐ Poor (complete "notes")
Arrival Temperature: 10°C
AGAT Job Number:
Notes:

Client Information
Company: GOLDER ASSOCIATES
Contact: TAMMIE MORGAN
Address: 2390 ARGENTIA RD. MISSISSAUGA
Phone: 905-567-4444 Fax: 905-567-6561
PO #:
Client Project #: 04-1112-069 (6000)
AGAT Quotation #:

Report Information - reports to be sent to:
1. Name: TAMMIE MORGAN
Email: tmorgan@golder.com
2. Name:
Email:
3. Name:
Email:
4. Name:
Email:

Report Format
☐ Single Sample per page
☒ Multiple Samples per page
☐ Excel Format Included

Turnaround Time (TAT) Required
Regular TAT:
☒ 5 to 7 Working Days
Rush TAT: (please provide prior notification)
☐ 3 to 5 days
☐ 48 to 72 Hours
☐ 24 to 48 hours
DATE REQUIRED:

Regulatory Guideline Required:
☐ Reg 153 Table ____ (Indicate one) ☐ Ind/Com ☐ Res/Park ☐ Ag
☐ Sewer Use Region ____ (Indicate one) ☐ Sanitary ☐ Storm
☐ PWQO ☐ Reg 558 ☐ CCME ☐ Other (indicate) ____

Is this a drinking water sample (potable water intended for human consumption)?
☐ Yes ☒ No
If "Yes" please use the Drinking Water Chain of Custody Record

Sample Identification	Date/Time Sampled	Sample Matrix	# of Containers	Comments- Site/ Sample Info. Sample Containment	Metals and Inorganics	Metals Scan (not incl. Hg, B, Cr6)	TCLP Metals/Inorganics	TCLP	Storm Sewer Use	Sanitary Sewer Use	CCME Fractions 1 to 4	VOCs	PAHs	PCBs
BH/BL-2-I	03/01/07	13:07	1			✓								
MW-2-I						✓								
BH2711-2-I						✓								
510-I						✓								
510A-I						✓								
511-I						✓								
511R-I						✓								
512-I						✓								
513-I	↓	↓	↓			✓								

Fluid samples are time sensitive - must be analyzed within 7 days of sample date.

Samples Relinquished By (print name & sign)	Date/Time	Samples Received By (print name & sign)	Date/Time
TAMMIE MORGAN	03/01/07 9:00	Jason Jan.04/07	09:30
Samples Relinquished By (print name & sign)	Date/Time	Samples Received By (print name & sign)	Date/Time
		Jason	09:50

Pink Copy - Client
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White Copy - AGAT

NO: 20872

F1

CHAIN OF CUSTODY RECORD

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Fax: 905-501-0589
Toll free: 800-856-6261
www.agatlabs.com

LABORATORY USE ONLY

Arrival Condition: ☐ Good ☐ Poor (complete "notes")
Arrival Temperature: 16°C
AGAT Job Number: 07T 203783
Notes:

Client Information

Company: GOLDER ASSOCIATES
Contact: TAMMIE MORGAN
Address: 2390 ARGENTIA RD. MISSISSAUGA
Phone: 905-567-4444 Fax: 905-567-6561
PO #:
Client Project #: 04-1112-069 (6000)
AGAT Quotation #:

Report Information - reports to be sent to:

1. Name: TAMMIE MORGAN
   Email: tmorgan@golder.com
2. Name:
   Email:
3. Name:
   Email:
4. Name:
   Email:

Report Format

☐ Single Sample per page
☒ Multiple Samples per page
☐ Excel Format Included

Turnaround Time (TAT) Required

Regular TAT:
☒ 5 to 7 Working Days

Rush TAT: (please provide prior notification)
☐ 3 to 5 days
☐ 48 to 72 Hours
☐ 24 to 48 hours

DATE REQUIRED:

Regulatory Guideline Required:

☐ Reg 153 Table ____ (Indicate one) ☐ Ind/Com ☐ Res/Park ☐ Ag
☐ Sewer Use Region ____ (Indicate one) ☐ Sanitary ☐ Storm
☐ PWQO
☐ Reg 558
☐ CCME
☐ Other (indicate)

Is this a drinking water sample (potable water intended for human consumption)? ☐ Yes ☒ No
If "Yes" please use the Drinking Water Chain of Custody Record

Sample Identification	Date/Time Sampled	Sample Matrix	# of Containers	Comments- Site/ Sample Info. Sample Containment						Metals and Inorganics	Metals Scan (not incl. Hg, B, Cr6)	TCLP Metals/Inorganics	TCLP	Storm Sewer Use	Sanitary Sewer Use	CCME Fractions 1 to 4	VOCs	PAHs	PCBs
9PM0552-D	04/01/07 9:15	dust	1								✓								
614-D	↓	↓	↓								✓								
614R-D											✓								
617-D											✓								
547-D											✓								
574-D											✓								
616-D											✓								
619-D											✓								
605-D											✓								
564-D	↓	↓	↓								✓								

Fluid samples are time sensitive - must be analyzed within 7 days of sample date

Samples Relinquished By (print name & sign)	Date/Time	Samples Received By (print name & sign)	Date/Time
TAMMIE MORGAN / Tammie Morgan	04/01/07 17:00	STONE	JAN. 4 07 4:40
Samples Relinquished By (print name & sign)	Date/Time	Samples Received By (print name & sign)	Date/Time
		5:00	

Pink Copy - Client
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White Copy - AGAT

PAGE 1 of 3

NO: 20873

CHAIN OF CUSTODY RECORD

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5623 McAdam Road
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http://webearth.agatlabs.com

Phone: 905-501-9998
Fax: 905-501-0589
Toll free: 800-856-6261
www.agatlabs.com

LABORATORY USE ONLY
Arrival Condition: ☐ Good ☐ Poor (complete "notes")
Arrival Temperature: 16.6 °C
AGAT Job Number:
Notes:

Client Information
Company: GOLDER ASSOCIATES
Contact: JAMMIE MORGAN
Address: 2390 ARGENTIA RD. MISSISSAUGA
Phone: 905-567-4444 Fax: 905-567-6561
PO #:
Client Project #: 07-1112-0041 (6000)
AGAT Quotation #:

Report Information - reports to be sent to:
1. Name: JAMMIE MORGAN
Email: jmorgan@golder.com
2. Name:
Email:
3. Name:
Email:
4. Name:
Email:

Report Format
☐ Single Sample per page
☒ Multiple Samples per page
☐ Excel Format Included

Turnaround Time (TAT) Required
Regular TAT:
☒ 5 to 7 Working Days
Rush TAT: (please provide prior notification)
☐ 3 to 5 days
☐ 48 to 72 Hours
☐ 24 to 48 hours
DATE REQUIRED:

Regulatory Guideline Required:
☐ Reg 153 Table ____ (Indicate one) ☐ Ind/Com ☐ Res/Park ☐ Ag
☐ Sewer Use Region ____ (Indicate one) ☐ Sanitary ☐ Storm
☐ PWQO ☐ Reg 558 ☐ CCME ☐ Other (indicate)

Is this a drinking water sample (potable water intended for human consumption)?
☐ Yes ☒ No
If "Yes" please use the Drinking Water Chain of Custody Record

Sample Identification	Date/Time Sampled	Sample Matrix	# of Containers	Comments- Site/ Sample Info. Sample Containment	Metals and Inorganics	Metals Scan (not incl. Hg, B, Cr6)	SPLP Metals/Inorganics	TCLP	Storm Sewer Use	Sanitary Sewer Use	CCME Fractions 1 to 4	VOCs	PAHs	PCBs
RIBL-3	04/01/07 11:13	Fluid	1			✓								
SPM0583-G						✓								
614-G						✓								
614R-G						✓								
617-G						✓								
547-G						✓								
574-G						✓								
616-G						✓								
619-G						✓								
605-G						✓								
564-G						✓								

Fluid samples are time sensitive - must be analyzed within 7 days from sample date.

Samples Relinquished By (print name & sign): JAMMIE MORGAN / Jammie Morgan — Date/Time: 04/01/07 17:00
Samples Received By (print name & sign): SIGVC — Date/Time: JAN 24 06
Samples Relinquished By (print name & sign): — Date/Time:
Samples Received By (print name & sign): — Date/Time:

Pink Copy – Client
Yellow Copy - AGAT
White Copy - AGAT

NO: 20874

CHAIN OF CUSTODY RECORD

AGAT Laboratories Limited
5623 McAdam Road
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http://webearth.agatlabs.com

Phone: 905-501-9998
Fax: 905-501-0589
Toll free: 800-856-6261
www.agatlabs.com

LABORATORY USE ONLY
Arrival Condition: ☐ Good ☐ Poor (complete "notes")
Arrival Temperature: 16°C
AGAT Job Number:
Notes:

Client Information
Company: GOLDER ASSOCIATES
Contact: TAMMIE MORGAN
Address: 2390 ARGENTIA RD. MISSISSAUGA
Phone: 905-567-4444 Fax: 905-567-6561
PO #:
Client Project #: 04-1112-069 (6000)
AGAT Quotation #:

Report Information - reports to be sent to:
1. Name: Tammie Morgan
Email: tmorgan@golder.com
2. Name:
Email:
3. Name:
Email:
4. Name:
Email:

Report Format
☐ Single Sample per page
☒ Multiple Samples per page
☐ Excel Format Included

Turnaround Time (TAT) Required
Regular TAT:
☒ 5 to 7 Working Days
Rush TAT: (please provide prior notification)
☐ 3 to 5 days
☐ 48 to 72 Hours
☐ 24 to 48 hours
DATE REQUIRED:

Regulatory Guideline Required:
☐ Reg 153 Table ____ (Indicate one) ☐ Ind/Com ☐ Res/Park ☐ Ag
☐ Sewer Use Region ____ (Indicate one) ☐ Sanitary ☐ Storm
☐ PWQO ☐ Reg 558 ☐ CCME ☐ Other (indicate)

Is this a drinking water sample (potable water intended for human consumption)? ☐ Yes ☒ No
If "Yes" please use the Drinking Water Chain of Custody Record

Sample Identification	Date/Time Sampled	Sample Matrix	# of Containers	Comments- Site/ Sample Info. Sample Containment						Metals and Inorganics	Metals Scan (not incl. Hg, B, Cr6)	TCLP Metals/Inorganics	TCLP	Storm Sewer Use	Sanitary Sewer Use	CCME Fractions 1 to 4	VOCs	PAHs	PCBs
SRM2583-I	04/01/07	Fluid	1								✓								
614-I	↓	↓	↓								✓								
614R-I											✓								
617-I											✓								
547-I											✓								
574-I											✓								
616-I											✓								
619-I											✓								
605-I											✓								
514-I	↓	↓	↓								✓								

Samples Relinquished By (print name & sign)	Date/Time	Samples Received By (print name & sign)	Date/Time
Tammie Morgan	04/01/07		JAN. 4 '07
Samples Relinquished By (print name & sign)	Date/Time	Samples Received By (print name & sign)	Date/Time
		5:00	

Pink Copy - Client
Yellow Copy - AGAT
White Copy - AGAT

PAGE 3 of 3

NO: 20875

CHAIN OF CUSTODY RECORD

AGAT Laboratories Limited
5623 McAdam Road
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Phone: 905-501-9998
Fax: 905-501-0589
Toll free: 800-856-6261
www.agatlabs.com

LABORATORY USE ONLY
Arrival Condition: ☐ Good ☐ Poor (complete "notes")
Arrival Temperature: 12°C
AGAT Job Number: 07 T 203942
Notes:

Client Information

Company: GOLDER ASSOCIATES
Contact: TAMMIE MORGAN
Address: 2390 ARGENTIA RD.
MISSISSAUGA
Phone: 905-567-4444 Fax: 905-567-6561
PO #:
Client Project #: 04-1112-069 (6000)
AGAT Quotation #:

Report Information - reports to be sent to:

1. Name: TAMMIE MORGAN
Email: tmorgan@golder.com
2. Name:
Email:
3. Name:
Email:

Notes (i.e. billing, sub-sampling requirements etc.)
Fluid samples are time sensitive - must be analyzed within 7 days of the sample date.

Report Format
☐ Single Sample per page
☒ Multiple Samples per page
☐ Results by Fax

Turnaround Time (TAT) Required*

Regular TAT:
☒ 5 to 7 Working Days
Rush TAT: (please provide prior notification)
Rush Surcharges Apply
☐ 3 to 5 days
☐ 48 to 72 Hours
☐ 24 to 48 hours
OR
DATE REQUIRED (Rush surcharges may apply):

Regulatory Guideline Required

☐ Reg 153 Table ____ (Indicate one) ☐ Ind/Com ☐ Res/Park ☐ Ag ☐ Med/Fine ☐ Coarse
☐ Sewer Use Region ____ (Indicate one) ☐ Sanitary ☐ Storm
☐ PWQO ☐ Reg 558 ☐ CCME ☐ Other (indicate) ____

Is this a drinking water sample (potable water intended for human consumption)?
☐ Yes ☒ No
If "Yes" please use the Drinking Water Chain of Custody Record

Sample Identification	Date Sampled	Time Sampled	Sample Matrix	# of Containers	Comments Site/ Sample Information	Metals & Inorganics	Metals Scan (incl. Hg, B, Cr6)	CCME Fractions 1 to 4	VOCs	PAHs	PCBs	TCLP Metals & Inorganics	TCLP	Storm Sewer Use	Sanitary Sewer Use
621D	05/01/07	9:59	dust	1			✓								
618D	"	"	"	1			✓								
Gastric Fluid		15:30	fluid	3											
Intestinal Fluid		15:30		3											
621G		11:59		1			✓								
618G				1			✓								
B/BL-3-G				1			✓								
BL/S-3				1			✓								
B/S-3-G				1			✓								
621I		15:30		1			✓								
618I				1			✓								
TOTAL # OF CONTAINERS				15											

*Samples received after 2:00 PM will be logged in for the next business day. TAT is exclusive of weekends and statutory holidays

Samples Relinquished By (print name & sign)	Date/Time	Samples Received By (print name & sign)	Date/Time
TAMMIE MORGAN	05/01/07 15:00	STOLE	4:30
Samples Relinquished By (print name & sign)	Date/Time	Samples Received By (print name & sign)	Date/Time
			JAN. 5 07

Pink Copy – Client
Yellow Copy - AGAT
White Copy - AGAT

NO: 42902

CHAIN OF CUSTODY RECORD

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www.agatlabs.com

F3

LABORATORY USE ONLY
Arrival Condition: ☐ Good ☐ Poor (complete "notes")
Arrival Temperature: ________
AGAT Job Number: NC
Notes: 07 T 203947 / 07 T 203947

Client Information

Company: GOLDER ASSOCIATES
Contact: TAMMIE MORGAN
Address: 2390 ARGENTIA RD. MISSISSAUGA
Phone: 905-567-4444 Fax: 905-567-6561
PO #: ________
Client Project #: 04-1112-069 (6000)
AGAT Quotation #: ________

Report Information – reports to be sent to:

1. Name: TAMMIE MORGAN
   Email: tmorgan@golder.com
2. Name: ________
   Email: ________
3. Name: ________
   Email: ________

Notes (i.e. billing, sub-sampling requirements etc.)
Fluid samples are time sensitive - must be analyzed within 7 days of the sample date.

Report Format
☐ Single Sample per page
☒ Multiple Samples per page
☐ Results by Fax

Turnaround Time (TAT) Required*

Regular TAT:
☒ 5 to 7 Working Days

Rush TAT: (please provide prior notification)
Rush Surcharges Apply
☐ 3 to 5 days
☐ 48 to 72 Hours
☐ 24 to 48 hours
OR
DATE REQUIRED (Rush surcharges may apply): ________

Regulatory Guideline Required

☐ Reg 153 Table ____ (Indicate one)
☐ Ind/Com
☐ Res/Park
☐ Ag
☐ Med/Fine ☐ Coarse

☐ Sewer Use
Region ________ (Indicate one)
☐ Sanitary
☐ Storm

☐ PWQO
☐ Reg 558
☐ CCME
☐ Other (indicate) ________

Is this a drinking water sample (potable water intended for human consumption)?
☐ Yes ☒ No
If "Yes" please use the Drinking Water Chain of Custody Record

Sample Identification	Date Sampled	Time Sampled	Sample Matrix	# of Containers	Comments Site/Sample Information	Metals and Inorganics	Metals Scan (not incl. Hg, B, Cr6)	CCME Fractions 1 to 4	VOCs	PAHs	PCBs	TCLP Metals/Inorganics	TCLP	Storm Sewer Use	Sanitary Sewer Use
B/BL-3-I	05/01/07	15:30	fluid	1			✓								
M/S-3-I		↓	↓	↓			✓								
R517-I							✓								
R565-I							✓								
R561-I							✓								
R560-I							✓								
R529-I							✓								
R530-I							✓								
R-552-I							✓								
R-502-I		↓	↓	↓			✓								

TOTAL # OF CONTAINERS 10

*Samples received after 2:00 PM will be logged in for the next business day. TAT is exclusive of weekends and statutory holidays

Samples Relinquished By (print name & sign)	Date/Time	Samples Received By (print name & sign)	Date/Time
TAMMIE MORGAN / Tammie Morgan	05/01/07 17:00	CHANG SN 4:30	JAN 05 07

Pink Copy – Client
Yellow Copy - AGAT
White Copy - AGAT

PAGE 2 of 2

NO: 42905

CHAIN OF CUSTODY RECORD

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www.agatlabs.com

LABORATORY USE ONLY

Arrival Condition: ☐ Good ☐ Poor (complete "notes")
Arrival Temperature: 4°C
AGAT Job Number: 07T204140
Notes:

Client Information

Company: GOLDER ASSOCIATES
Contact: TAMMIE MORGAN
Address: 2390 ARGENTIA RD.
MISSISSAUGA
Phone: 905-567-4444 Fax: 905-567-6561
PO #:
Client Project #: 04-1112-069 (6000)
AGAT Quotation #:

Report Information - reports to be sent to:

1. Name: TAMMIE MORGAN
Email: tmorgan@golder.com
2. Name:
Email:
3. Name:
Email:

Notes (i.e. billing, sub-sampling requirements etc.)
Fluid samples are time sensitive - must be analyzed within 7 days of sample date.

Report Format

☐ Single Sample per page
☒ Multiple Samples per page
☐ Results by Fax

Turnaround Time (TAT) Required*

Regular TAT:
☒ 5 to 7 Working Days
Rush TAT: (please provide prior notification)
Rush Surcharges Apply
☐ 3 to 5 days
☐ 48 to 72 Hours
☐ 24 to 48 hours
OR
DATE REQUIRED (Rush surcharges may apply):

Regulatory Guideline Required

☐ Reg 153 Table ____ (Indicate one) ☐ Ind/Com ☐ Res/Park ☐ Ag
☐ Sewer Use Region ____ (Indicate one) ☐ Sanitary ☐ Storm
☐ PWQO ☐ Reg 558 ☐ CCME ☐ Other (indicate)
☐ Med/Fine ☐ Coarse

Is this a drinking water sample (potable water intended for human consumption)?
☐ Yes ☒ No
If "Yes" please use the Drinking Water Chain of Custody Record

Sample Identification	Date Sampled	Time Sampled	Sample Matrix	# of Containers	Comments Site/Sample Information	Metals and Inorganics	Metals Scan (not incl. Hg, B, Cr6)	CCME Fractions + Total	VOCs	PAHs	PCBs	TCLP Metals/Inorganics	TCLP ____	Storm Sewer Use	Sanitary Sewer Use						
R/BL-9	06/01/07	11:54	Fluid	1			✓														
R553-I	↓	↓	↓	↓			✓														
R516-I							✓														
R506-I							✓														
R582-I							✓														
R582R-I							✓														
R554-I							✓														
R519-I							✓														
R607-I							✓														
R533-I							✓														
R566-I							✓														
			TOTAL # OF CONTAINERS	11																	

*Samples received after 2:00 PM will be logged in for the next business day. TAT is exclusive of weekends and statutory holidays

Samples Relinquished By (print name & sign)	Date/Time	Samples Received By (print name & sign)	Date/Time
TAMMIE MORGAN	06/01/07	STEVE	10:32 JAN.8.07
Samples Relinquished By (print name & sign)	Date/Time	Samples Received By (print name & sign)	Date/Time
			5:10

Pink Copy - Client
Yellow Copy - AGAT
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NO: 42900

CHAIN OF CUSTODY RECORD

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F1

LABORATORY USE ONLY
Arrival Condition: ☐ Good ☐ Poor (complete "notes")
Arrival Temperature: 4.0 c OTTAWA/MC
AGAT Job Number:
Notes:

Client Information

Company: GOLDER ASSOCIATES
Contact: TAMMIE MORGAN
Address: 2390 ARGENTIA RD.
MISSISSAUGA
Phone: 905-567-4444 Fax: 905-567-6561
PO #:
Client Project #: 04-1112-069 (6000)
AGAT Quotation #:

Report Information - reports to be sent to:

1. Name: TAMMIE MORGAN
Email: tmorgan@golder.com
2. Name:
Email:
3. Name:
Email:

Notes (i.e. billing, sub-sampling requirements etc.)
Fluid samples are time sensitive - must be analyzed within 4days of sample date

Report Format

☐ Single Sample per page
☒ Multiple Samples per page
☐ Results by Fax

Turnaround Time (TAT) Required*

Regular TAT:
☒ 5 to 7 Working Days
Rush TAT: (please provide prior notification)
Rush Surcharges Apply
☐ 3 to 5 days
☐ 48 to 72 Hours
☐ 24 to 48 hours
OR
DATE REQUIRED (Rush surcharges may apply):

Regulatory Guideline Required

☐ Reg 153 Table ____ (Indicate one) ☐ Ind/Com ☐ Res/Park ☐ Ag ☐ Med/Fine ☐ Coarse
☐ Sewer Use Region ____ (Indicate one) ☐ Sanitary ☐ Storm
☐ PWQO ☐ Reg 558 ☐ CCME ☐ Other (Indicate)

Is this a drinking water sample (potable water intended for human consumption)?
☐ Yes ☒ No
If "Yes" please use the Drinking Water Chain of Custody Record

Sample Identification	Date Sampled	Time Sampled	Sample Matrix	# of Containers	Comments Site/ Sample Information	Metals and Inorganics	Metals Scan (not incl. Hg, B, CrVI)	CCME Fractions 1 to 4	VOCs	PAHs	PCBs	CLP Metals/Inorganics	TCLP	Storm Sewer Use	Sanitary Sewer Use
R584-I	06/01/54	11:54	Fluid	1			✓								
TOTAL # OF CONTAINERS				1											

*Samples received after 2:00 PM will be logged in for the next business day. TAT is exclusive of weekends and statutory holidays

Samples Relinquished By (print name & sign)	Date/Time	Samples Received By (print name & sign)	Date/Time
TAMMIE MORGAN	06/01/57	SMG/G	JAN. 8.07
Samples Relinquished By (print name & sign)	Date/Time	Samples Received By (print name & sign)	Date/Time

Pink Copy - Client
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White Copy - AGAT

NO: 42901

CHAIN OF CUSTODY RECORD

E 5

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LABORATORY USE ONLY
Arrival Condition: ☐ Good ☐ Poor (complete "notes")
Arrival Temperature: 15°C
AGAT Job Number: 07T 204136
Notes:

Client Information

Company: GOLDER ASSOCIATES
Contact: TAMMIE MORGAN
Address: 2390 ARGENTIA RD.
MISSISSAUGA
Phone: 905-567-4444 Fax: 905-567-6561
PO #:
Client Project #: 04-1117-004 (6000)
AGAT Quotation #:

Report Information - reports to be sent to:

1. Name: TAMMIE MORGAN
Email: tmorgan@golder.com
2. Name:
Email:
3. Name:
Email:
4. Name:
Email:

Report Format
☐ Single Sample per page
☒ Multiple Samples per page
☐ Excel Format Included

Turnaround Time (TAT) Required

Regular TAT:
☒ 5 to 7 Working Days
Rush TAT: (please provide prior notification)
☐ 3 to 5 days
☐ 48 to 72 Hours
☐ 24 to 48 hours
DATE REQUIRED:

Regulatory Guideline Required:

☐ Reg 153 Table ____ (Indicate one) ☐ Ind/Com ☐ Res/Park ☐ Ag
☐ Sewer Use Region ____ (Indicate one) ☐ Sanitary ☐ Storm
☐ PWQO ☐ Reg 558 ☐ CCME ☐ Other (indicate)

Is this a drinking water sample (potable water intended for human consumption)?
☐ Yes ☒ No
If "Yes" please use the Drinking Water Chain of Custody Record

Sample Identification	Date/Time Sampled	Sample Matrix	# of Containers	Comments- Site/ Sample Info. Sample Containment	Metals and Inorganics	Metals Scan (not incl. Hg, B, Cr6)	PCUP Metals/Inorganics	TCLP	Storm Sewer Use	Sanitary Sewer Use	CCME Fractions 1 to 4	VOCs	PAHs	PCBs
R517-G	05/01/07	Fluid	1	ACL	✓									
R505-G				Fluid samples are time sensitive	✓									
R561-G				must be analyzed within 7 days	✓									
R560-G				of sample date.	✓									
R559-G					✓									
R530-G					✓									
R550-G					✓									
R502G					✓									
R553-G	06/01/07				✓									
R516-G					✓									
R506-G					✓									

Samples Relinquished By (print name & sign): TAMMIE MORGAN / [signature] T.D.
Date/Time: 08/01/07
Samples Received By (print name & sign): SIGNS 4:50
Date/Time: JAN 8 07
Samples Relinquished By (print name & sign):
Date/Time:
Samples Received By (print name & sign): 5:30
Date/Time:

Pink Copy – Client
Yellow Copy - AGAT
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PAGE 1 of 2

NO: 20877

ES

CHAIN OF CUSTODY RECORD

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LABORATORY USE ONLY
Arrival Condition: ☐ Good ☐ Poor (complete "notes")
Arrival Temperature: _____
AGAT Job Number: 07 C041356
Notes: _____

Client Information
Company: GOLDER ASSOCIATES
Contact: TAMMIE MORGAN
Address: 2390 ARGENTIA RD. MISSISSAUGA
Phone: 905-567-4444 Fax: 905-567-6561
PO #: _____
Client Project #: 04-1112-0064 (6000)
AGAT Quotation #: _____

Report Information - reports to be sent to:
1. Name: TAMMIE MORGAN
Email: tmorgan@golder.com
2. Name: _____
Email: _____
3. Name: _____
Email: _____
4. Name: _____
Email: _____

Report Format
☐ Single Sample per page
☒ Multiple Samples per page
☐ Excel Format Included

Turnaround Time (TAT) Required
Regular TAT:
☒ 5 to 7 Working Days
Rush TAT: (please provide prior notification)
☐ 3 to 5 days
☐ 48 to 72 Hours
☐ 24 to 48 hours
DATE REQUIRED: _____

Regulatory Guideline Required:
☐ Reg 153 Table ____ (Indicate one) ☐ Ind/Com ☐ Res/Park ☐ Ag
☐ Sewer Use Region _____ (Indicate one) ☐ Sanitary ☐ Storm
☐ PWQO ☐ Reg 558 ☐ CCME ☐ Other (indicate) _____

Is this a drinking water sample (potable water intended for human consumption)? ☐ Yes ☒ No
If "Yes" please use the Drinking Water Chain of Custody Record

Sample Identification	Date/Time Sampled	Sample Matrix	# of Containers	Comments- Site/ Sample Info. Sample Containment	Metals and Inorganics	Metals Scan (not incl. Hg, B, Cr6)	TCLP Metals/Inorganics	TCLP	Storm Sewer Use	Sanitary Sewer Use	CCME Fractions 1 to 4	VOCs	PAHs	PCBs
R582-G	06/01/07	Fluid	1	ALL		✓								
R582R-G				Fluid samples are time sensitive - must be analyzed within 7 days of sample date.		✓								
R554-G						✓								
R519-G						✓								
R607-G						✓								
R533-G						✓								
R566-G						✓								
R584-G						✓								
B/BL-4-G	07/01/07	Fluid	1			✓								
M/S-4-G						✓								
SRM2711-4-G						✓								
R534-G						✓								

Samples Relinquished By (print name & sign): TAMMIE MORGAN — Date/Time: 08/01/07 7:00
Samples Received By (print name & sign): STEVE — Date/Time: 08/01/07 9:50
Samples Relinquished By (print name & sign): _____ — Date/Time: _____
Samples Received By (print name & sign): _____ — Date/Time: _____

Pink Copy – Client
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NO: 20878

CHAIN OF CUSTODY RECORD

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Toll free: 800-856-6261
www.agatlabs.com

F55

LABORATORY USE ONLY
Arrival Condition: ☐ Good ☐ Poor (complete "notes")
Arrival Temperature: 15°C
AGAT Job Number:
Notes:

Client Information
Company: GOLDER ASSOCIATES
Contact: TAMMIE MORGAN
Address: 2390 ARGENTIA RD.
MISSISSAUGA
Phone: 905-567-4444 Fax: 905-567-6561
PO #:
Client Project #: 04-1112-069 (6000)
AGAT Quotation #:

Report Information - reports to be sent to:
1. Name: TAMMIE MORGAN
Email: tmorgan@golder.com
2. Name:
Email:
3. Name:
Email:
4. Name:
Email:

Report Format
☐ Single Sample per page
☒ Multiple Samples per page
☐ Excel Format Included

Turnaround Time (TAT) Required
Regular TAT:
☒ 5 to 7 Working Days
Rush TAT: (please provide prior notification)
☐ 3 to 5 days
☐ 48 to 72 Hours
☐ 24 to 48 hours
DATE REQUIRED:

Regulatory Guideline Required:
☐ Reg 153 Table ____ (Indicate one) ☐ Ind/Com ☐ Res/Park ☐ Ag
☐ Sewer Use Region ____ (Indicate one) ☐ Sanitary ☐ Storm
☐ PWQO ☐ Reg 558 ☐ CCME ☐ Other (indicate) ____

Is this a drinking water sample (potable water intended for human consumption)?
☐ Yes ☒ No
If "Yes" please use the Drinking Water Chain of Custody Record

Sample Identification	Date/Time Sampled	Sample Matrix	# of Containers	Comments- Site/ Sample Info. Sample Containment	Metals and Inorganics	Metals Scan (not incl. Hg, B, Cr6)	TCLP Metals/Inorganics	TCLP	Storm Sewer Use	Sanitary Sewer Use	CCME Fractions 1 to 4	VOCs	PAHs	PCBs
R581-G	07/01/07	Fluid	1	ALL		✓								
R593-G						✓								
R501-G				Fluid samples have time sensitive - must be analyzed within 7 days of sample date.		✓								
R525-G						✓								
R541-G						✓								
R551-G						✓								

Samples Relinquished By (print name & sign): TAMMIE MORGAN / [signature] — Date/Time: 08/01/07
Samples Relinquished By (print name & sign): — Date/Time:
Samples Received By (print name & sign): STEVE AJ — Date/Time: JAN. 8.07 4:50
Samples Received By (print name & sign): — Date/Time: 5:30

Pink Copy - Client
Yellow Copy - AGAT
White Copy - AGAT

PAGE 3 of 3
NO: 20879

CHAIN OF CUSTODY RECORD

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LABORATORY USE ONLY

Arrival Condition: ☐ Good ☐ Poor (complete "notes")
Arrival Temperature: 4°C
AGAT Job Number: 07T 204141
Notes:

Client Information

Company: GOLDER ASSOCIATES
Contact: TAMMIE MURGAN
Address: 2390 ARGENTIA RD.
MISSISSAUGA
Phone: 905-567-4444 Fax: 905-567-6561
PO #:
Client Project #: 04-1112-069 (6000)
AGAT Quotation #:

Report Information - reports to be sent to:

1. Name: TAMMIE MURGAN
Email: tmurgan@golder.com
2. Name:
Email:
3. Name:
Email:
4. Name:
Email:

Report Format

☐ Single Sample per page
☒ Multiple Samples per page
☐ Excel Format Included

Turnaround Time (TAT) Required

Regular TAT:
☒ 5 to 7 Working Days

Rush TAT: (please provide prior notification)
☐ 3 to 5 days
☐ 48 to 72 Hours
☐ 24 to 48 hours

DATE REQUIRED:

Regulatory Guideline Required:

☐ Reg 153 Table ____ (Indicate one) ☐ Ind/Com ☐ Res/Park ☐ Ag
☐ Sewer Use Region ____ (Indicate one) ☐ Sanitary ☐ Storm
☐ PWQO ☐ Reg 558 ☐ CCME ☐ Other (indicate) ____

Is this a drinking water sample (potable water intended for human consumption)? ☐ Yes ☒ No
If "Yes" please use the Drinking Water Chain of Custody Record

Sample Identification	Date/Time Sampled	Sample Matrix	# of Containers	Comments- Site/ Sample Info. Sample Containment	Metals and Inorganics	Metals Scan (not incl. Hg, B, Cr6)	TCLP Metals/Inorganics	TCLP	Storm Sewer Use	Sanitary Sewer Use	CCME Fractions 1 to 4	VOCs	BTEX	PCBs
B/BL-4-I	07/01/04	Fluid	1			✓								
MW5-4-I						✓								
DUP#1-4-I						✓								
R534-I						✓								
R581-I						✓								
R593-I						✓								
R501-I						✓								
R525-I						✓								
R541-I						✓								
R551-I						✓								
BL/S-4						✓								

Samples Relinquished By (print name & sign): TAMMIE MURGAN
Date/Time: 06/01/07
Samples Received By (print name & sign): STAN
Date/Time: JAN. 8.07

Samples Relinquished By (print name & sign):
Date/Time:
Samples Received By (print name & sign):
Date/Time:

Pink Copy – Client
Yellow Copy - AGAT
White Copy - AGAT

NO: 20876

CHAIN OF CUSTODY RECORD

AGAT Laboratories Limited
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LABORATORY USE ONLY
Arrival Condition: ☐ Good ☐ Poor (complete "notes")
Arrival Temperature: 15°C
AGAT Job Number: 07T 204135
Notes:

Client Information

Company: GOLDER ASSOCIATES LTD.
Contact: TAMMIE MORGAN
Address: 2390 ARGENTIA ROAD
MISSISSAUGA, ON
Phone: 905-567-4444 Fax: 905-567-6561
PO #:
Client Project #: 04-1117-069 (60000)
AGAT Quotation #:

Report Information - reports to be sent to:

1. Name: TAMMIE MORGAN
Email: tmorgan@golder.com
2. Name:
Email:
3. Name:
Email:
4. Name:
Email:

Report Format
☐ Single Sample per page
☒ Multiple Samples per page
☐ Excel Format Included

Turnaround Time (TAT) Required

Regular TAT:
☒ 5 to 7 Working Days
Rush TAT: (please provide prior notification)
☐ 3 to 5 days
☐ 48 to 72 Hours
☐ 24 to 48 hours
DATE REQUIRED:

Regulatory Guideline Required:

☐ Reg 153 Table ____ (Indicate one) ☐ Ind/Com ☐ Res/Park ☐ Ag
☐ Sewer Use Region ____ (Indicate one) ☐ Sanitary ☐ Storm
☐ PWQO ☐ Reg 558 ☐ CCME ☐ Other (indicate) ____

Is this a drinking water sample (potable water intended for human consumption)?
☐ Yes ☒ No
If "Yes" please use the Drinking Water Chain of Custody Record

Sample Identification	Date/Time Sampled	Sample Matrix	# of Containers	Comments- Site/ Sample Info. Sample Containment	Metals and Inorganics	Metals Scan (not incl. Hg, B, Cr6)	CCME Metals/Inorganics	TCLP	Storm Sewer Use	Sanitary Sewer Use	CCME Fractions 1 to 4	VOCs	PAHs	PCBs
R599-G	JAN. 8/07	FLUID	1	Fluid Sample are TIME SENSITIVE Analyze within 7 DAYS of sample date		✓								
R599R-G						✓								
R602-G						✓								
R526-G						✓								
R514-G						✓								
R523-G						✓								
R531-G						✓								
R563-G						✓								
R596-G						✓								
R599-I						✓								
R599R-I						✓								
R602-I						✓								

Samples Relinquished By (print name & sign): TAMMIE MORGAN
Date/Time: 08/01/07
Samples Received By (print name & sign): STEVE 4:50
Date/Time: JAN. 9.07
Samples Relinquished By (print name & sign):
Date/Time:
Samples Received By (print name & sign): 5:36
Date/Time:

Pink Copy - Client
Yellow Copy - AGAT
White Copy - AGAT

NO: 20881

CHAIN OF CUSTODY RECORD

AGAT Laboratories Limited
5623 McAdam Road
Mississauga, Ontario L4Z 1N9
http://webearth.agatlabs.com

Phone: 905-501-9998
Fax: 905-501-0589
Toll free: 800-856-6261
www.agatlabs.com

CS

LABORATORY USE ONLY
Arrival Condition: ☐ Good ☐ Poor (complete "notes")
Arrival Temperature: 15°C
AGAT Job Number: 07T-94155
Notes:

Client Information
Company: GOLDER ASSOCIATES LTD.
Contact: TANMIE MORGAN
Address: 2390 ARGENTIA RD
MISSISSAUGA, ON
Phone: 905-567-9444 Fax: 905-567-6561
PO #:
Client Project #: 04-1112-069 (600220)
AGAT Quotation #:

Report Information - reports to be sent to:
1. Name: TANMIE MORGAN
Email: tmorgan@golder.com
2. Name:
Email:
3. Name:
Email:
4. Name:
Email:

Report Format
☐ Single Sample per page
☒ Multiple Samples per page
☐ Excel Format Included

Turnaround Time (TAT) Required
Regular TAT:
☑ 5 to 7 Working Days
Rush TAT: (please provide prior notification)
☐ 3 to 5 days
☐ 48 to 72 Hours
☐ 24 to 48 hours
DATE REQUIRED:

Regulatory Guideline Required:
☐ Reg 153 Table ____ (Indicate one) ☐ Ind/Com ☐ Res/Park ☐ Ag
☐ Sewer Use Region ____ (Indicate one) ☐ Sanitary ☐ Storm
☐ PWQO ☐ Reg 558 ☐ CCME ☐ Other (indicate) ____

Is this a drinking water sample (potable water intended for human consumption)?
☐ Yes ☒ No
If "Yes" please use the Drinking Water Chain of Custody Record

Sample Identification	Date/Time Sampled	Sample Matrix	# of Containers	Comments- Site/ Sample Info. Sample Containment	Metals and Inorganics	Metals Scan (not incl. Hg, B, Cr6)	TCLP Metals/Inorganics	TCLP	Storm Sewer Use	Sanitary Sewer Use	CCME Fractions 1 to 4	VOCs	PAHs	PCBs
R526 - I	JAN 8/07	FLUID	1	TIME-SENSITIVE		✓								
R514 - I				Analyze within		✓								
R503 - I				7 days of		✓								
R531 - I				Sample Date		✓								
R563 - I						✓								
R596 - T						✓								
Pepsin	JAN 8/07	Powder	1			✓								

Samples Relinquished By (print name & sign)	Date/Time	Samples Received By (print name & sign)	Date/Time
Tanmie Morgan / Tanmie Morgan	08/01/07	STEVE	JAN.8.07
Samples Relinquished By (print name & sign)	Date/Time	Samples Received By (print name & sign)	Date/Time

4:50
5:30

Pink Copy - Client
Yellow Copy - AGAT
White Copy - AGAT

PAGE 2 of 2
NO: 20880

CERTIFICATES OF ANALYSES

Certificate of Analysis

AGAT WORK ORDER: 06T201592

PROJECT NO: 04-1112-069 (6000)

CLIENT NAME: GOLDER ASSOCIATES LTD.

ATTENTION TO: Tammie Morgan

Metals in Soil

DATE SAMPLED: December 12 2006 **DATE RECEIVED:** December 18 2006 **DATE REPORTED:** December 22 2006 **SAMPLE TYPE:** Soil

	Unit	G / S	M.D.L.	517 - S 635389	521 - S 635390	565 - S 635391	561 - S 635392	560 - S 635393	529 - S 635394	530 - S 635395	552 - S 635396
Arsenic	µg/g		0.6	58.3	20.8	4.6	12.5	3.3	8.1	9.2	4.4
Cobalt	µg/g		0.3	23.6	33.1	11.3	20.2	6.8	8.9	15.6	13.8
Copper	µg/g		0.6	338	1540	187	271	45.1	69.0	543	145
Lead	µg/g		0.5	44.5	84.6	33.5	105	12.6	15.7	41.2	19.8
Nickel	µg/g		0.6	426	1040	157	391	56.2	102	474	238
Selenium	µg/g		0.8	1.4	10.2	1.3	1.3	<0.8	<0.8	4.5	<0.8

	Unit	G / S	M.D.L.	502 - S 635397	553 - S 635398
Arsenic	µg/g		0.6	164	6.0
Cobalt	µg/g		0.3	44.3	12.1
Copper	µg/g		0.6	1140	141
Lead	µg/g		0.5	113	20.2
Nickel	µg/g		0.6	749	198
Selenium	µg/g		0.8	4.1	<0.8

Comments: M.D.L. - Method Detection Limit; G / S - Guideline / Standard

Certified By: Elizabeth Rolakowska

Certificate of Analysis

AGAT WORK ORDER: 06T201592

PROJECT NO: 04-1112-069 (6000)

CLIENT NAME: GOLDER ASSOCIATES LTD.

ATTENTION TO: Tammie Morgan

Metals Scan (fluid)

DATE SAMPLED: December 12 2006 **DATE RECEIVED:** December 18 2006 **DATE REPORTED:** December 22 2006 **SAMPLE TYPE:** Water

	Unit	G / S	M.D.L.	517 - G 635399	521 - G 635400	565 - G 635401	561 - G 635402	560 - G 635403	529 - G 635404	530 - G 635405	552 - G 635406
Arsenic	ug/L		6.0	119	48.4	10.7	26.3	7.7	15.4	33.4	10.9
Cobalt	ug/L		5.0	52.5	107	37.1	69.3	14.9	20.8	51.5	37.2
Copper	ug/L		10.0	1580	7290	1220	1310	184	373	4030	509
Lead	ug/L		5.0	231	476	242	685	85.3	104	291	143
Nickel	ug/L		10.0	1210	4390	653	1050	155	442	2440	776
Selenium	ug/L		5.0	6.4	11.2	6.7	10.0	<5.0	<5.0	13.1	<5.0

	Unit	G / S	M.D.L.	502 - G 635407	553 - G 635408	517 - I 635409	521 - I 635410	565 - I 635411	561 - I 635412	560 - I 635413	529 - I 635414
Arsenic	ug/L		6.0	204	14.2	77.4	46.3	12.1	26.0	9.5	14.4
Cobalt	ug/L		5.0	111	36.3	32.7	60.0	23.2	43.9	8.6	12.5
Copper	ug/L		10.0	6530	611	1300	7580	1090	1110	169	320
Lead	ug/L		5.0	501	127	27.8	90.1	31.0	106	8.6	6.3
Nickel	ug/L		10.0	3450	565	839	3070	436	714	107	297
Selenium	ug/L		5.0	10.2	5.2	<5.0	14.3	<5.0	<5.0	<5.0	<5.0

	Unit	G / S	M.D.L.	530 - I 635415	552 - I 635416	502 - I 635417	553 - I 635418	R/BL - I 635419
Arsenic	ug/L		6.0	23.9	12.2	178	14.9	<6.0
Cobalt	ug/L		5.0	28.6	22.8	66.6	22.9	<5.0
Copper	ug/L		10.0	2850	496	4970	609	16.7
Lead	ug/L		5.0	29.0	26.6	67.2	12.6	8.9
Nickel	ug/L		10.0	1590	568	2180	407	15.0
Selenium	ug/L		5.0	7.4	<5.0	5.6	<5.0	<5.0

Comments: M.D.L. - Method Detection Limit; G / S - Guideline / Standard

635399 Samples were diluted as necessary prior to analysis by ICP-MS.

Certified By: Elizabeth Rolokowska

Certificate of Analysis

AGAT WORK ORDER: 06T201734

PROJECT NO: 04-1112-069 (6000)

CLIENT NAME: GOLDER ASSOCIATES LTD.

ATTENTION TO: Tammie Morgan

Metals in Soil

DATE SAMPLED: December 18 2006 DATE RECEIVED: December 19 2006 DATE REPORTED: December 22 2006 SAMPLE TYPE: Soil

	Unit	G / S	M.D.L.	516-S 635896	506-S 635897	582-S 635898	582R-S 635899	554-S 635900	519-S 635901	607-S 635902	533-S 635904
Arsenic	µg/g		0.6	23.4	16.5	2.6	2.5	18.5	31.6	5.8	16.3
Cobalt	µg/g		0.3	49.8	22.2	7.5	7.5	16.5	23.5	8.2	29.5
Copper	µg/g		0.6	2570	449	35.6	34.3	448	269	329	1340
Lead	µg/g		0.5	79.6	113	6.6	6.2	39.5	27.5	14.1	65.8
Nickel	µg/g		0.6	1620	652	51.0	48.1	518	343	208	797
Selenium	µg/g		0.8	10.3	1.4	<0.8	<0.8	1.7	1.2	4.4	5.1

	Unit	G / S	M.D.L.	566-S 635906	584-S 635907
Arsenic	µg/g		0.6	4.4	42.4
Cobalt	µg/g		0.3	9.7	39.0
Copper	µg/g		0.6	180	1690
Lead	µg/g		0.5	16.5	291
Nickel	µg/g		0.6	219	1280
Selenium	µg/g		0.8	1.1	8.4

Comments: M.D.L. - Method Detection Limit; G / S - Guideline / Standard

Certified By: Elizabeth Rolakowska

Certificate of Analysis

AGAT WORK ORDER: 06T201734
PROJECT NO: 04-1112-069 (6000)

CLIENT NAME: GOLDER ASSOCIATES LTD.

ATTENTION TO: Tammie Morgan

Metals Scan (fluid)

DATE SAMPLED: December 18 2006 DATE RECEIVED: December 19 2006 DATE REPORTED: December 22 2006 SAMPLE TYPE: Water

	Unit	G / S	M.D.L.	516-G 635908	506-G 635909	582-G 635910	582R-G 635911	554-G 635912	519-G 635913	607-G 635914	533-G 635925
Arsenic	ug/L		6.0	32.5	58.9	6.0	<6.0	54.0	109	24.4	48.3
Cobalt	ug/L		5.0	71.8	93.0	11.0	10.2	44.3	74.8	23.0	54.2
Copper	ug/L		10.0	3240	16700	169	159	2750	1380	2340	7240
Lead	ug/L		5.0	793	543	24.1	24.3	195	158	87.5	421
Nickel	ug/L		10.0	3330	4650	120	118	2460	1130	555	1950
Selenium	ug/L		5.0	5.1	16.6	8.5	5.0	7.7	7.1	11.2	8.4

	Unit	G / S	M.D.L.	566-G 635927	584-G 635930	516-I 635934	506-I 635936	582-I 635938	582R-I 635941	554-I 635944	519-I 635948
Arsenic	ug/L		6.0	15.3	117	32.8	56.1	7.3	6.4	49.9	84.2
Cobalt	ug/L		5.0	13.5	77.9	56.7	71.6	9.8	9.3	34.2	56.3
Copper	ug/L		10.0	931	9280	2190	11400	140	124	1960	967
Lead	ug/L		5.0	103	2120	467	290	17.6	16.0	119	89.7
Nickel	ug/L		10.0	296	3280	2310	3240	91.4	85.8	1680	784
Selenium	ug/L		5.0	7.2	15.8	<5.0	11.4	<5.0	<5.0	<5.0	<5.0

	Unit	G / S	M.D.L.	607-I 635949	533-I 635950	566-I 635951	584-I 635952
Arsenic	ug/L		6.0	20.6	44.1	15.7	99.7
Cobalt	ug/L		5.0	17.7	44.9	10.7	57.1
Copper	ug/L		10.0	1610	4640	622	6050
Lead	ug/L		5.0	51.5	235	63.6	1260
Nickel	ug/L		10.0	412	1320	219	2190
Selenium	ug/L		5.0	<5.0	6.7	5.7	<5.0

Comments: M.D.L. - Method Detection Limit; G / S - Guideline / Standard
635908 Samples were diluted as necessary prior to analysis by ICP-MS.

Certified By: Elizabeth Rolokowska

Certificate of Analysis

AGAT WORK ORDER: 06T201953

PROJECT NO: 64-1112-069 (6000)

CLIENT NAME: GOLDER ASSOCIATES LTD.

ATTENTION TO: Tammie Morgan

Metals in Soil

DATE SAMPLED: December 19 2006 DATE RECEIVED: December 20 2006 DATE REPORTED: December 22 2006 SAMPLE TYPE: Soil

	Unit	G / S	M.D.L.	SRM 2711- 5 636717	534 - 5 636718	581 - 5 636719	593 - 5 636720	501 - 5 636721	525 - 5 636722	541 - 5 636723	551 - 5 636724
Arsenic	µg/g		0.6	84.1	186	101	2.3	86.2	12.9	2.4	1.8
Cobalt	µg/g		0.3	8.1	88.9	43.9	6.6	64.1	13.2	5.5	4.5
Copper	µg/g		0.6	101	1660	623	17.6	1070	240	38.4	21.6
Lead	µg/g		0.5	897	206	53.4	4.3	76.2	27.1	7.6	12.0
Nickel	µg/g		0.6	15.5	1800	778	25.1	1030	261	48.7	29.2
Selenium	µg/g		0.8	1.5	4.5	2.5	<0.8	3.7	1.1	<0.8	<0.8

Comments: M.D.L. - Method Detection Limit; G / S - Guideline / Standard

Certified By: Elizabeth Rolakowska

Certificate of Analysis

AGAT WORK ORDER: 06T201953
PROJECT NO: 64-1112-069 (6000)

CLIENT NAME: GOLDER ASSOCIATES LTD.

ATTENTION TO: Tammie Morgan

Metals Scan (fluid)

DATE SAMPLED: December 19 2006 DATE RECEIVED: December 20 2006 DATE REPORTED: December 22 2006 SAMPLE TYPE: Water

	Unit	G / S	M.D.L.	B/BL - G 636726	BL/ 5 636728	M/ 5 - G 636729	SRM - 2711 - G 636731	534 - G 636732	581 - G 636733	593 - G 636734	501-G 636735
Arsenic	ug/L		6.0	<6.0	973	991	545	284	139	<6.0	108
Cobalt	ug/L		5.0	<5.0	9030	8910	37.1	152	145	8.8	174
Copper	ug/L		10.0	10.9	9120	9010	411	5480	1830	62.0	4900
Lead	ug/L		5.0	<5.0	9180	8960	8230	986	195	23.3	337
Nickel	ug/L		10.0	<10.0	8810	8990	41.4	4500	3770	47.9	4470
Selenium	ug/L		5.0	5.9	910	958	14.8	9.3	8.2	6.0	8.3

	Unit	G / S	M.D.L.	525-G 636736	541-G 636737	551-G 636738	B/BL-I 636739	M/S-I 636740	SRM2711-I 636741	534-I 636742	581-I 636743
Arsenic	ug/L		6.0	20.2	6.2	<6.0	<6.0	740	371	336	180
Cobalt	ug/L		5.0	26.3	13.1	7.7	<5.0	5710	24.7	119	103
Copper	ug/L		10.0	1220	209	108	17.4	5440	296	4410	1790
Lead	ug/L		5.0	125	44.5	78.3	<5.0	5720	4850	671	130
Nickel	ug/L		10.0	560	146	79.9	10.0	5460	32.8	3210	2610
Selenium	ug/L		5.0	10.6	8.3	9.9	<5.0	736	8.6	<5.0	<5.0

	Unit	G / S	M.D.L.	593-I 636744	501-I 636745	525-I 636746	541-I 636747	551-I 636748
Arsenic	ug/L		6.0	<6.0	97.8	22.0	7.4	<6.0
Cobalt	ug/L		5.0	7.0	126	19.7	9.3	6.2
Copper	ug/L		10.0	56.1	3470	920	158	83.7
Lead	ug/L		5.0	15.5	162	78.4	27.2	47.7
Nickel	ug/L		10.0	36.3	2970	410	105	58.5
Selenium	ug/L		5.0	<5.0	<5.0	<5.0	<5.0	<5.0

Comments: M.D.L. - Method Detection Limit; G / S - Guideline / Standard
636726 Samples were diluted as necessary prior to analysis by ICP-MS.

Certified By: Elizabeth Rolokowska

Certificate of Analysis

AGAT WORK ORDER: 06T202297
PROJECT NO: 04-1112-069 (6000)

CLIENT NAME: GOLDER ASSOCIATES LTD.

ATTENTION TO: Tammie Morgan

Metals in Soil

DATE SAMPLED: December 20 2006 DATE RECEIVED: December 21 2006 DATE REPORTED: December 28 2006 SAMPLE TYPE: Soil

	Unit	G / S	M.D.L.	599-S 638165	599R-S 638169	602-S 638170	526-S 638171	514-S 638172	523-S 638174	531-S 638178	520-S 638180
Arsenic	µg/g		0.6	4.4	4.2	14.5	3.8	109	138	3.0	6.8
Cobalt	µg/g		0.3	7.2	6.9	25.6	6.4	124	104	5.4	8.3
Copper	µg/g		0.6	96.1	94.2	1320	59.7	1840	1650	70.2	145
Lead	µg/g		0.5	23.1	18.8	61.0	15.3	108	184	10.3	38.0
Nickel	µg/g		0.6	96.7	90.9	819	81.5	2500	2270	77.2	145
Selenium	µg/g		0.8	<0.8	<0.8	6.1	<0.8	3.7	4.2	<0.8	<0.8

	Unit	G / S	M.D.L.	563-S 638181	596-S 638183
Arsenic	µg/g		0.6	9.4	4.7
Cobalt	µg/g		0.3	14.5	9.1
Copper	µg/g		0.6	461	154
Lead	µg/g		0.5	30.8	19.9
Nickel	µg/g		0.6	338	141
Selenium	µg/g		0.8	1.6	<0.8

Comments: M.D.L. - Method Detection Limit; G / S - Guideline / Standard

Certified By: Elizabeth Rolokowska

Certificate of Analysis

AGAT WORK ORDER: 06T202297
PROJECT NO: 04-1112-069 (6000)

CLIENT NAME: GOLDER ASSOCIATES LTD.

ATTENTION TO: Tammie Morgan

Metals Scan (fluid)

DATE SAMPLED: December 20 2006 DATE RECEIVED: December 21 2006 DATE REPORTED: December 28 2006 SAMPLE TYPE: Water

	Unit	G / S	M.D.L.	599-G 638186	599R-G 638192	602-G 638193	526-G 638194	514-G 638195	523-G 638196	531-G 638197	520-G 638198
Arsenic	ug/L		6.0	10.9	10.5	30.1	10.0	274	310	7.8	18.0
Cobalt	ug/L		5.0	15.8	15.5	52.1	20.3	289	202	13.0	23.1
Copper	ug/L		10.0	405	388	6190	277	5590	5310	483	724
Lead	ug/L		5.0	99.3	95.9	312	88.7	500	992	71.6	234
Nickel	ug/L		10.0	224	215	1970	323	6860	5930	254	602
Selenium	ug/L		5.0	<5.0	<5.0	6.8	5.5	7.1	6.0	5.2	5.8

	Unit	G / S	M.D.L.	563-G 638199	596-G 638200	R/BL-2 638202	599-I 638203	599R-I 638204	602-I 638205	526-I 638206	514-I 638207
Arsenic	ug/L		6.0	22.4	11.7	<6.0	11.3	11.5	28.2	10.2	182
Cobalt	ug/L		5.0	36.8	16.9	<5.0	10.9	11.3	39.3	13.6	208
Copper	ug/L		10.0	2760	866	12.0	275	288	4350	202	3970
Lead	ug/L		5.0	181	119	<5.0	52.0	48.4	171	44.0	227
Nickel	ug/L		10.0	1670	589	<10.0	154	155	1360	215	4440
Selenium	ug/L		5.0	6.6	5.1	<5.0	<5.0	<5.0	8.2	<5.0	5.2

	Unit	G / S	M.D.L.	523-I 638208	531-I 638209	520-I 638210	563-I 638211	596-I 638212
Arsenic	ug/L		6.0	244	7.7	18.2	19.4	16.8
Cobalt	ug/L		5.0	145	10.4	14.4	25.7	15.3
Copper	ug/L		10.0	3530	349	527	1960	1160
Lead	ug/L		5.0	516	42.3	113	94.5	21.8
Nickel	ug/L		10.0	3920	180	382	1130	557
Selenium	ug/L		5.0	6.4	<5.0	<5.0	<5.0	6.7

Comments: M.D.L. - Method Detection Limit; G / S - Guideline / Standard
638186 Samples were diluted as necessary prior to analysis by ICP-MS.

Certified By: Elizabeth Pololowska

Certificate of Analysis

AGAT WORK ORDER: 07T203574

PROJECT NO: 04-1112-069 (6000)

CLIENT NAME: GOLDER ASSOCIATES LTD.

ATTENTION TO: Tammie Morgan

Metals in Soil

DATE SAMPLED: January 03 2007 DATE RECEIVED: January 04 2007 DATE REPORTED: January 08 2007 SAMPLE TYPE: Soil

	Unit	G / S	M.D.L.	SRM2711 - 2 - S 641091	570 - S 641092	570R - S 641093	511 - S 641094	511R - S 641095	512 - S 641096	513 - S 641097
Arsenic	µg/g		0.6	82.1	17.4	16.8	5.7	5.3	23.0	3.5
Cobalt	µg/g		0.3	7.2	15.0	14.3	7.8	7.7	27.3	7.1
Copper	µg/g		0.6	102	488	450	194	193	1350	54.8
Lead	µg/g		0.5	974	42.9	40.6	19.9	19.0	106	46.5
Nickel	µg/g		0.6	16.4	343	328	122	120	865	46.3
Selenium	µg/g		0.8	0.9	3.0	2.9	1.9	1.7	5.6	<0.8

Comments: M.D.L. - Method Detection Limit; G / S - Guideline / Standard

Certified By: Elizabeth Rolakowska

Certificate of Analysis

AGAT WORK ORDER: 07T203574
PROJECT NO: 04-1112-069 (6000)

CLIENT NAME: GOLDER ASSOCIATES LTD.

ATTENTION TO: Tammie Morgan

Metals Scan (fluid)

DATE SAMPLED: January 03 2007 DATE RECEIVED: January 04 2007 DATE REPORTED: January 08 2007 SAMPLE TYPE: Water

	Unit	G / S	M.D.L.	B/BL - 2 - G 641098	BL/S - 2 - G 641099	M/S - 2 - G 641100	SRM2711 - 2 - G 641101	570 - G 641102	570R - G 641103	511 - G 641104	511R - G 641105
Arsenic	ug/L		6.0	<6.0	1090	1110	572	38.3	36.3	11.9	12.4
Cobalt	ug/L		5.0	<5.0	9300	8980	38.5	43.4	43.3	17.4	17.9
Copper	ug/L		10.0	25.9	9370	9210	484	2930	2890	1280	1310
Lead	ug/L		5.0	<5.0	9190	9010	8610	314	247	133	138
Nickel	ug/L		10.0	<10.0	9420	9040	44.6	1600	1600	440	459
Selenium	ug/L		5.0	7.7	1040	1090	13.5	8.5	<5.0	10.6	7.4

	Unit	G / S	M.D.L.	512 - G 641106	513 - G 641107	B/BL - 2 - I 641108	M/S - 2 - I 641109	SRM2711 - 2 - I 641110	570 - I 641111	570R - I 641112	511 - I 641113
Arsenic	ug/L		6.0	46.9	6.5	<6.0	783	377	32.6	33.0	10.8
Cobalt	ug/L		5.0	77.1	10.2	<5.0	5990	24.1	22.8	24.5	11.7
Copper	ug/L		10.0	7370	251	31.0	5840	403	2280	2350	918
Lead	ug/L		5.0	749	307	<5.0	1250	2210	49.7	37.2	13.1
Nickel	ug/L		10.0	3530	95.8	13.0	6260	36.9	1040	1100	330
Selenium	ug/L		5.0	14.1	7.3	<5.0	726	5.4	<5.0	6.3	<5.0

	Unit	G / S	M.D.L.	511R - I 641114	512 - I 641115	513 - I 641116
Arsenic	ug/L		6.0	12.0	35.8	9.1
Cobalt	ug/L		5.0	11.5	45.0	8.1
Copper	ug/L		10.0	934	4990	217
Lead	ug/L		5.0	12.5	81.9	33.2
Nickel	ug/L		10.0	338	2350	81.6
Selenium	ug/L		5.0	<5.0	6.6	<5.0

Comments: M.D.L. - Method Detection Limit; G / S - Guideline / Standard

Certified By: Elizabeth Rolakowska

Certificate of Analysis

AGAT WORK ORDER: 07T203723

PROJECT NO: 04-1112-069 (6000)

CLIENT NAME: GOLDER ASSOCIATES LTD.

ATTENTION TO: Tammie Morgan

Metals in Soil

DATE SAMPLED: January 04 2007 DATE RECEIVED: January 05 2007 DATE REPORTED: January 11 2007 SAMPLE TYPE: Soil

	Unit	G / S	M.D.L.	SRM2583-D 641400	614-D 641401	614R-D 641402	617-D 641403	547-D 641404	574-D 641405	616-D 641406	619-D 641407
Arsenic	µg/g		0.6	5.2	7.9	8.4	5.9	10.2	22.2	13.9	8.0
Cobalt	µg/g		0.3	3.3	35.4	36.8	13.1	10.6	12.8	22.9	17.0
Copper	µg/g		0.6	204	545	579	183	331	460	604	310
Lead	µg/g		0.5	69.0	65.9	66.7	54.5	115	64.0	73.1	84.8
Nickel	µg/g		0.6	37.7	571	596	165	189	270	494	252
Selenium	µg/g		0.8	<0.8	3.5	3.9	1.3	1.4	1.8	6.6	3.5

	Unit	G / S	M.D.L.	605-D 641408	564-D 641409
Arsenic	µg/g		0.6	18.7	38.3
Cobalt	µg/g		0.3	9.3	7.2
Copper	µg/g		0.6	157	187
Lead	µg/g		0.5	28.5	52.0
Nickel	µg/g		0.6	110	77.7
Selenium	µg/g		0.8	1.3	1.4

Comments: M.D.L. - Method Detection Limit; G / S - Guideline / Standard

Certified By: Elizabeth Rolokowska

Certificate of Analysis

AGAT WORK ORDER: 07T203723
PROJECT NO: 04-1112-069 (6000)

CLIENT NAME: GOLDER ASSOCIATES LTD.

ATTENTION TO: Tammie Morgan

Metals Scan (fluid)

DATE SAMPLED: January 04 2007 DATE RECEIVED: January 05 2007 DATE REPORTED: January 11 2007 SAMPLE TYPE: Fluid

	Unit	G / S	M.D.L.	R/BL-3 641410	SRM2583-G 641411	614-G 641412	614R-G 641413	617-G 641414	547-G 641415	574-G 641416	616-G 641417
Arsenic	ug/L		6.0	<6.0	33.5	28.1	30.9	21.3	38.6	101	66.6
Cobalt	ug/L		5.0	<5.0	16.3	58.6	58.1	36.3	27.7	36.5	70.3
Copper	ug/L		10.0	10.1	878	2180	2190	774	1880	2580	2570
Lead	ug/L		5.0	<5.0	517	494	475	421	912	790	621
Nickel	ug/L		10.0	<10.0	246	1120	1180	477	813	928	1480
Selenium	ug/L		5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	6.9	7.9

	Unit	G / S	M.D.L.	619-G 641418	605-G 641419	564-G 641420	SRM2583-I 641421	614-I 641422	614R-I 641477	617-I 641478	547-I 641479
Arsenic	ug/L		6.0	35.1	56.3	108	26.5	26.5	28.4	21.2	20.8
Cobalt	ug/L		5.0	49.3	32.5	30.0	12.0	38.5	41.5	26.1	12.3
Copper	ug/L		10.0	1200	712	1170	831	1630	1670	656	1050
Lead	ug/L		5.0	764	234	522	178	88.8	64.8	59.2	63.5
Nickel	ug/L		10.0	756	451	319	187	857	938	373	370
Selenium	ug/L		5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0

	Unit	G / S	M.D.L.	574-I 641480	616-I 641481	619-I 641482	605-I 641483	564-I 641484
Arsenic	ug/L		6.0	50.7	35.9	19.4	31.0	52.6
Cobalt	ug/L		5.0	17.4	30.0	22.2	15.0	16.0
Copper	ug/L		10.0	1520	1250	602	402	643
Lead	ug/L		5.0	59.4	67.8	60.4	12.9	55.9
Nickel	ug/L		10.0	469	762	349	193	153
Selenium	ug/L		5.0	<5.0	<5.0	<5.0	<5.0	<5.0

Comments: M.D.L. - Method Detection Limit; G / S - Guideline / Standard

Certified By: Elizabeth Rolokowska

Certificate of Analysis

AGAT WORK ORDER: 07T203942

PROJECT NO: 04-1112-069 (6000)

CLIENT NAME: GOLDER ASSOCIATES LTD.

ATTENTION TO: Tammie Morgan

Metals in Soil

DATE SAMPLED: January 05 2007 DATE RECEIVED: January 08 2007 DATE REPORTED: January 12 2007 SAMPLE TYPE: Dust

	Unit	G / S	M.D.L.	621D 642005	618D 642006
Arsenic	µg/g		0.6	6.7	10.0
Cobalt	µg/g		0.3	19.9	23.6
Copper	µg/g		0.6	431	386
Lead	µg/g		0.5	60.1	80.1
Nickel	µg/g		0.6	368	350
Selenium	µg/g		0.8	4.2	3.6

Comments: M.D.L. - Method Detection Limit; G / S - Guideline / Standard

Certified By: Elizabeth Rolakowska

Certificate of Analysis

AGAT WORK ORDER: 07T203942
PROJECT NO: 04-1112-069 (6000)

CLIENT NAME: GOLDER ASSOCIATES LTD.

ATTENTION TO: Tammie Morgan

Metals Scan (fluid)

DATE SAMPLED: January 05 2007 DATE RECEIVED: January 08 2007 DATE REPORTED: January 12 2007 SAMPLE TYPE: Fluid

	Unit	G / S	M.D.L.	621G 642009	618G 642010	B/BL - 3 - G 642011	BL/S - 3 642012	M/S - 3 - G 642013	621 - I 642014	618 - I 642015	B/BL - 3 - I 642016
Arsenic	ug/L		6.0	32.1	33.3	<6.0	1008	1060	19.2	23.5	8.0
Cobalt	ug/L		5.0	45.8	58.5	<5.0	9110	9200	19.9	24.3	<5.0
Copper	ug/L		10.0	1250	1370	14	9170	9340	683	754	27.9
Lead	ug/L		5.0	437	591	<5.0	8710	8240	51.6	33.4	<5.0
Nickel	ug/L		10.0	705	997	<10.0	9240	9200	336	499	<10.0
Selenium	ug/L		5.0	8.6	<5.0	<5.0	1030	1060	<5.0	<5.0	<5.0

	Unit	G / S	M.D.L.	M/S - 3 - I 642017	R517 - I 642018	R565 - I 642019	R561 - I 642020	R560 - I 642021	R529 - I 642022	R530 - I 642023	R - 552 - I 642024
Arsenic	ug/L		6.0	743	82.2	14.8	29.3	11.4	17.9	25.7	16.6
Cobalt	ug/L		5.0	5890	35.4	24.2	41.8	9.2	12.2	32.1	24.7
Copper	ug/L		10.0	5680	1370	1230	1220	201	336	2910	572
Lead	ug/L		5.0	2980	66	40.3	107	18	11.4	58.4	50
Nickel	ug/L		10.0	5900	878	500	767	115	308	1580	614
Selenium	ug/L		5.0	680	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0

	Unit	G / S	M.D.L.	R - 502 - I 642025
Arsenic	ug/L		6.0	198
Cobalt	ug/L		5.0	66.3
Copper	ug/L		10.0	5490
Lead	ug/L		5.0	71
Nickel	ug/L		10.0	2440
Selenium	ug/L		5.0	9.6

Comments: M.D.L. - Method Detection Limit; G / S - Guideline / Standard

Certified By: Elizabeth Rolakowska

Certificate of Analysis

AGAT WORK ORDER: 07T204136
PROJECT NO: 04-1112-069(6000)

CLIENT NAME: GOLDER ASSOCIATES LTD.

ATTENTION TO: Tammie Morgan

Metals Scan (fluid)

DATE SAMPLED: January 05 2007 DATE RECEIVED: January 08 2007 DATE REPORTED: January 11 2007 SAMPLE TYPE: Fluid

	Unit	G / S	M.D.L.	R517-G 642340	R565-G 642341	R561-G 642342	R560-G 642343	R529-G 642344	R530-G 642345	R552-G 642346	R502-G 642347
Arsenic	ug/L		6.0	143	8.6	30.2	10.2	20.0	28.1	14.1	233
Cobalt	ug/L		5.0	55.7	39.5	69.6	16.8	21.7	50.6	42.7	119
Copper	ug/L		10.0	1750	1310	1400	194	377	3700	555	6880
Lead	ug/L		5.0	269	247	626	83	129	249	153	507
Nickel	ug/L		10.0	1290	728	1080	159	452	2420	856	3760
Selenium	ug/L		5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0

	Unit	G / S	M.D.L.	R553-G 642348	R516-G 642349	R506-G 642350	R582-G 642352	R582R-G 642353	R554-G 642354	R519-G 642355	R607-G 642356
Arsenic	ug/L		6.0	17.0	26.7	71.7	<6.0	8.2	53.2	94.8	22.7
Cobalt	ug/L		5.0	36.4	72.8	99.9	10.5	11.2	44.5	78.0	26.4
Copper	ug/L		10.0	653	3160	17300	141	151	2910	1300	2580
Lead	ug/L		5.0	126	740	562	24.4	34.8	205	149	91.8
Nickel	ug/L		10.0	553	3350	4860	122	125	2540	1110	606
Selenium	ug/L		5.0	<5.0	<5.0	7.5	<5.0	<5.0	<5.0	<5.0	<5.0

	Unit	G / S	M.D.L.	R533-G 642357	R566-G 642358	R584-G 642359	B/BL-4-G 642360	M/S-4-G 642363	SRM2711-4-G 642366	R534-G 642371	R581-G 642375
Arsenic	ug/L		6.0	44.3	16.0	129	<6.0	1060	506	327	163
Cobalt	ug/L		5.0	60.8	15.5	82.7	<5.0	8760	35.5	192	151
Copper	ug/L		10.0	7400	998	9510	17.0	8730	412	6710	2200
Lead	ug/L		5.0	451	123	2010	<5.0	8160	8020	1300	263
Nickel	ug/L		10.0	2100	319	3380	<10.0	8600	36.0	5470	3840
Selenium	ug/L		5.0	<5.0	<5.0	<5.0	<5.0	1020	<5.0	<5.0	<5.0

Certified By: Elizabeth Rolakowska

Certificate of Analysis

AGAT WORK ORDER: 07T204136
PROJECT NO: 04-1112-069(6000)

CLIENT NAME: GOLDER ASSOCIATES LTD.

ATTENTION TO: Tammie Morgan

Metals Scan (fluid)

DATE SAMPLED: January 05 2007 DATE RECEIVED: January 08 2007 DATE REPORTED: January 11 2007 SAMPLE TYPE: Fluid

	Unit	G / S	M.D.L.	R593-G 642379	R501-G 642382	R525-G 642383	R541-G 642384	R551-G 642385
Arsenic	ug/L		6.0	<6.0	80.5	18.5	<6.0	<6.0
Cobalt	ug/L		5.0	8.2	197	29.5	13.6	7.6
Copper	ug/L		10.0	58.2	5020	1340	203	100
Lead	ug/L		5.0	15.7	311	138	42.1	76.0
Nickel	ug/L		10.0	40.0	5010	586	146	75.5
Selenium	ug/L		5.0	<5.0	<5.0	<5.0	<5.0	<5.0

Comments: M.D.L. - Method Detection Limit; G / S - Guideline / Standard

Certified By: Elizabeth Rolakowska

Certificate of Analysis

AGAT WORK ORDER: 07T204138
PROJECT NO: 60842

CLIENT NAME: GOLDER ASSOCIATES LTD.

ATTENTION TO: Tammie Morgan

Metals Scan (powder)

DATE SAMPLED: January 08 2007 DATE RECEIVED: January 09 2007 DATE REPORTED: January 12 2007 SAMPLE TYPE: Powder

	Unit	G / S	M.D.L.	Pepsin 642337
Arsenic	µg/g		0.6	<0.6
Cobalt	µg/g		0.3	<0.3
Copper	µg/g		0.6	<0.6
Lead	µg/g		0.5	<0.5
Nickel	µg/g		0.6	<0.6
Selenium	µg/g		0.8	<0.8

Comments: M.D.L. - Method Detection Limit; G / S - Guideline / Standard

Certified By: Elizabeth Rolakowska

Certificate of Analysis

AGAT WORK ORDER: 07T204138
PROJECT NO: 60842

CLIENT NAME: GOLDER ASSOCIATES LTD.

ATTENTION TO: Tammie Morgan

Metals Scan (fluid)

DATE SAMPLED: January 08 2007 DATE RECEIVED: January 09 2007 DATE REPORTED: January 12 2007 SAMPLE TYPE: Fluid

	Unit	G / S	M.D.L.	R599-G 642318	R599R-G 642319	R602-G 642320	R526-G 642321	R514-G 642322	R523-G 642323	R531-G 642324	R563-G 642325
Arsenic	ug/L		6.0	8.5	9.2	32.7	7.6	245	260	<6.0	17.5
Cobalt	ug/L		5.0	17.3	18.3	74.6	21.3	289	253	14.7	44.8
Copper	ug/L		10.0	418	437	7430	275	5650	5760	525	3130
Lead	ug/L		5.0	105	114	396	93.3	508	1060	87.9	213
Nickel	ug/L		10.0	229	234	2400	321	6720	6970	268	1910
Selenium	ug/L		5.0	5.1	<5.0	9.9	<5.0	6.7	6.8	<5.0	<5.0

	Unit	G / S	M.D.L.	R596-G 642326	R599-I 642327	R599R-I 642328	R602-I 642329	R526-I 642330	R514-I 642331	R523-I 642333	R531-I 642334
Arsenic	ug/L		6.0	10.2	7.7	8.3	26.5	9.1	125	211	<6.0
Cobalt	ug/L		5.0	18.5	10.4	10.0	41.2	11.9	164	149	10.3
Copper	ug/L		10.0	964	389	367	5660	276	4720	4690	423
Lead	ug/L		5.0	139	13.5	13.8	62.4	12.4	139	226	9.2
Nickel	ug/L		10.0	615	168	158	1630	227	4620	4800	196
Selenium	ug/L		5.0	<5.0	<5.0	<5.0	10.0	<5.0	<5.0	<5.0	<5.0

	Unit	G / S	M.D.L.	R563-I 642335	R596-I 642336	Pepsin 642337
Arsenic	ug/L		6.0	17.8	9.3	
Cobalt	ug/L		5.0	29.0	10.7	
Copper	ug/L		10.0	2830	826	
Lead	ug/L		5.0	32.7	22.2	
Nickel	ug/L		10.0	1320	408	
Selenium	ug/L		5.0	<5.0	<5.0	

Comments: M.D.L. - Method Detection Limit; G / S - Guideline / Standard

Certified By: Elizabeth Rolokowska

Certificate of Analysis

AGAT WORK ORDER: 07T204140
PROJECT NO: 04-1112-069(6000)

CLIENT NAME: GOLDER ASSOCIATES LTD.

ATTENTION TO: Tammie Morgan

Metals Scan (fluid)

DATE SAMPLED: January 06 2007 DATE RECEIVED: January 08 2007 DATE REPORTED: January 10 2007 SAMPLE TYPE: Fluid

	Unit	G / S	M.D.L.	R/BL-4 642420	R553-I 642425	R516-I 642427	R506-I 642428	R582-I 642430	R582R-I 642432	R554-I 642433	R519-I 642434
Arsenic	ug/L		6.0	<6.0	11.6	19.8	49.7	<6.0	<6.0	41.5	62.1
Cobalt	ug/L		5.0	<5.0	20.7	47.3	59.3	8.7	8.2	28.9	50.0
Copper	ug/L		10.0	<10.0	532	2400	12000	140	131	2210	1150
Lead	ug/L		5.0	<5.0	14.7	91.7	87.8	<5.0	<5.0	33.9	15.5
Nickel	ug/L		10.0	<10.0	382	2310	3240	95.8	92.8	1770	830
Selenium	ug/L		5.0	<5.0	<5.0	<5.0	13.3	<5.0	<5.0	<5.0	<5.0

	Unit	G / S	M.D.L.	R607-I 642435	R533-I 642436	R566-I 642437	R584-I 642438
Arsenic	ug/L		6.0	12.5	38.3	12.9	85.4
Cobalt	ug/L		5.0	15.5	37.8	10.8	43.0
Copper	ug/L		10.0	1770	6010	766	6430
Lead	ug/L		5.0	7.1	82.7	16.0	297
Nickel	ug/L		10.0	407	1490	254	2150
Selenium	ug/L		5.0	<5.0	<5.0	<5.0	6.2

Comments: M.D.L. - Method Detection Limit; G / S - Guideline / Standard

Certified By: Elizabeth Rolokowska

Certificate of Analysis

AGAT WORK ORDER: 07T204141

PROJECT NO: 04-1112-069(6000)

CLIENT NAME: GOLDER ASSOCIATES LTD.

ATTENTION TO: Tammie Morgan

Metals Scan (fluid)

DATE SAMPLED: January 07 2007 DATE RECEIVED: January 09 2007 DATE REPORTED: January 10 2007 SAMPLE TYPE: Fluid

	Unit	G / S	M.D.L.	B/BL-4-I 642398	M/S-4-I 642399	SRM2711-4-I 642400	R534-I 642401	R581-I 642402	R593-I 642403	R501-I 642404	R525-I 642405
Arsenic	ug/L		6.0	<6.0	815	382	368	174	<6.0	102	20.0
Cobalt	ug/L		5.0	<5.0	6500	24.9	140	98.1	6.4	126	20.5
Copper	ug/L		10.0	24.0	6160	411	6630	2690	64.0	5480	1260
Lead	ug/L		5.0	<5.0	1020	1430	367	46.6	<5.0	61.4	21.2
Nickel	ug/L		10.0	<10.0	6420	32.1	4270	3070	34.8	3800	485
Selenium	ug/L		5.0	<5.0	749	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0

	Unit	G / S	M.D.L.	R541-I 642406	R551-I 642407	BL/S-4 642408
Arsenic	ug/L		6.0	6.5	<6.0	1300
Cobalt	ug/L		5.0	9.0	5.9	10400
Copper	ug/L		10.0	204	103	10400
Lead	ug/L		5.0	<5.0	9.7	10800
Nickel	ug/L		10.0	117	62.1	10500
Selenium	ug/L		5.0	<5.0	<5.0	1160

Comments: M.D.L. - Method Detection Limit; G / S - Guideline / Standard

Certified By: Elizabeth Rolokowska

PROUCL OUTPUTS

Data File					Variable:	arsenic; gastric; dust	
Raw Statistics				Normal Distribution Test			
Number of Valid Samples			10	Shapiro-Wilk Test Statisitic			0.921185
Number of Unique Samples			10	Shapiro-Wilk 5% Critical Value			0.842
Minimum			28.13092	Data are normal at 5% significance level			
Maximum			47.85624				
Mean			38.64848	95% UCL (Assuming Normal Distribution)			
Median			36.97326	Student			42.8363
Standard Deviation			7.224359				
Variance			52.19137	Gamma Distribution Test			
Coefficient of Variation			0.186925	A-D Test Statistic			0.35259
Skewness			0.008612	A-D 5% Critical Value			0.724491
				K-S Test Statistic			0.181624
Gamma Statistics				K-S 5% Critical Value			0.266055
k hat			31.15231	Data follow gamma distribution			
k star (bias corrected)			21.87328	at 5% significance level			
Theta hat			1.24063				
Theta star			1.766926	95% UCLs (Assuming Gamma Distribution)			
nu hat			623.0461	Approximate Gamma UCL			43.35608
nu star			437.4656	Adjusted Gamma UCL			44.24154
Approx.Chi Square Value (.05)			389.9656				
Adjusted Level of Significance			0.0267	Lognormal Distribution Test			
Adjusted Chi Square Value			382.1607	Shapiro-Wilk Test Statisitic			0.925863
				Shapiro-Wilk 5% Critical Value			0.842
Log-transformed Statistics				Data are lognormal at 5% significance level			
Minimum of log data			3.336869				
Maximum of log data			3.868202	95% UCLs (Assuming Lognormal Distribution)			
Mean of log data			3.638371	95% H-UCL			43.62396
Standard Deviation of log data			0.190695	95% Chebyshev (MVUE) UCL			48.84701
Variance of log data			0.036365	97.5% Chebyshev (MVUE) UCL			53.25651
				99% Chebyshev (MVUE) UCL			61.91813
				95% Non-parametric UCLs			
				CLT UCL			42.40622
				Adj-CLT UCL (Adjusted for skewness)			42.41286
				Mod-t UCL (Adjusted for skewness)			42.83734
				Jackknife UCL			42.8363
				Standard Bootstrap UCL			42.26165
				Bootstrap-t UCL			42.59945
RECOMMENDATION				Hall's Bootstrap UCL			42.05719
Data are normal (0.05)				Percentile Bootstrap UCL			42.40796
				BCA Bootstrap UCL			42.40713
Use Student's-t UCL				95% Chebyshev (Mean, Sd) UCL			48.60657
				97.5% Chebyshev (Mean, Sd) UCL			52.91544
				99% Chebyshev (Mean, Sd) UCL			61.37939

Data File					Variable:	arsenic; intestinal; dust		
Raw Statistics				Normal Distribution Test				
Number of Valid Samples			10	Shapiro-Wilk Test Statisitic				0.965084
Number of Unique Samples			10	Shapiro-Wilk 5% Critical Value				0.842
Minimum			30.08446	Data are normal at 5% significance level				
Maximum			52.99396					
Mean			40.80131	95% UCL (Assuming Normal Distribution)				
Median			39.4233	Student				45.15056
Standard Deviation			7.502833					
Variance			56.2925	Gamma Distribution Test				
Coefficient of Variation			0.183887	A-D Test Statistic				0.182397
Skewness			0.304996	A-D 5% Critical Value				0.72448
				K-S Test Statistic				0.13647
Gamma Statistics				K-S 5% Critical Value				0.266035
k hat			33.06667	Data follow gamma distribution				
k star (bias corrected)			23.21333	at 5% significance level				
Theta hat			1.233911					
Theta star			1.757667	95% UCLs (Assuming Gamma Distribution)				
nu hat			661.3334	Approximate Gamma UCL				45.61235
nu star			464.2667	Adjusted Gamma UCL				46.51521
Approx.Chi Square Value (.05)			415.2974					
Adjusted Level of Significance			0.0267	Lognormal Distribution Test				
Adjusted Chi Square Value			407.2365	Shapiro-Wilk Test Statisitic				0.974435
				Shapiro-Wilk 5% Critical Value				0.842
Log-transformed Statistics				Data are lognormal at 5% significance level				
Minimum of log data			3.404009					
Maximum of log data			3.970178	95% UCLs (Assuming Lognormal Distribution)				
Mean of log data			3.693517	95% H-UCL				45.82745
Standard Deviation of log data			0.183901	95% Chebyshev (MVUE) UCL				51.1722
Variance of log data			0.03382	97.5% Chebyshev (MVUE) UCL				55.65969
				99% Chebyshev (MVUE) UCL				64.47447
				95% Non-parametric UCLs				
				CLT UCL				44.7039
				Adj-CLT UCL (Adjusted for skewness)				44.94841
				Mod-t UCL (Adjusted for skewness)				45.1887
				Jackknife UCL				45.15056
				Standard Bootstrap UCL				44.54366
				Bootstrap-t UCL				45.51206
RECOMMENDATION				Hall's Bootstrap UCL				44.71357
Data are normal (0.05)				Percentile Bootstrap UCL				44.61352
				BCA Bootstrap UCL				44.6187
Use Student's-t UCL				95% Chebyshev (Mean, Sd) UCL				51.14325
				97.5% Chebyshev (Mean, Sd) UCL				55.61822
				99% Chebyshev (Mean, Sd) UCL				64.40842

Data File					Variable:	cobalt; gastric; dust	
Raw Statistics				Normal Distribution Test			
Number of Valid Samples			10	Shapiro-Wilk Test Statisitic			0.968946
Number of Unique Samples			10	Shapiro-Wilk 5% Critical Value			0.842
Minimum			16.15793	Data are normal at 5% significance level			
Maximum			41.56691				
Mean			28.22796	95% UCL (Assuming Normal Distribution)			
Median			28.09846	Student			32.18038
Standard Deviation			6.818271				
Variance			46.48883	Gamma Distribution Test			
Coefficient of Variation			0.241543	A-D Test Statistic			0.255632
Skewness			0.318441	A-D 5% Critical Value			0.724633
				K-S Test Statistic			0.131158
Gamma Statistics				K-S 5% Critical Value			0.266245
k hat			18.36279	Data follow gamma distribution			
k star (bias corrected)			12.92062	at 5% significance level			
Theta hat			1.537237				
Theta star			2.184722	95% UCLs (Assuming Gamma Distribution)			
nu hat			367.2558	Approximate Gamma UCL			32.83094
nu star			258.4124	Adjusted Gamma UCL			33.7175
Approx.Chi Square Value (.05)			222.1824				
Adjusted Level of Significance			0.0267	Lognormal Distribution Test			
Adjusted Chi Square Value			216.3403	Shapiro-Wilk Test Statisitic			0.955575
				Shapiro-Wilk 5% Critical Value			0.842
Log-transformed Statistics				Data are lognormal at 5% significance level			
Minimum of log data			2.782411				
Maximum of log data			3.727304	95% UCLs (Assuming Lognormal Distribution)			
Mean of log data			3.312837	95% H-UCL			33.33389
Standard Deviation of log data			0.251966	95% Chebyshev (MVUE) UCL			38.11989
Variance of log data			0.063487	97.5% Chebyshev (MVUE) UCL			42.38767
				99% Chebyshev (MVUE) UCL			50.77092
				95% Non-parametric UCLs			
				CLT UCL			31.77447
				Adj-CLT UCL (Adjusted for skewness)			32.00647
				Mod-t UCL (Adjusted for skewness)			32.21657
				Jackknife UCL			32.18038
				Standard Bootstrap UCL			31.53524
				Bootstrap-t UCL			32.71214
RECOMMENDATION				Hall's Bootstrap UCL			33.91162
Data are normal (0.05)				Percentile Bootstrap UCL			31.76082
				BCA Bootstrap UCL			31.79568
Use Student's-t UCL				95% Chebyshev (Mean, Sd) UCL			37.6263
				97.5% Chebyshev (Mean, Sd) UCL			41.69297
				99% Chebyshev (Mean, Sd) UCL			49.68115

Data File					Variable:	cobalt; intestinal; dust	
Raw Statistics				Normal Distribution Test			
Number of Valid Samples			10	Shapiro-Wilk Test Statisitic			0.916853
Number of Unique Samples			10	Shapiro-Wilk 5% Critical Value			0.842
Minimum			15.81084	Data are normal at 5% significance level			
Maximum			55.42254				
Mean			31.88696	95% UCL (Assuming Normal Distribution)			
Median			30.79781	Student			37.9771
Standard Deviation			10.50602				
Variance			110.3765	Gamma Distribution Test			
Coefficient of Variation			0.329477	A-D Test Statistic			0.325027
Skewness			1.058983	A-D 5% Critical Value			0.725024
				K-S Test Statistic			0.17895
Gamma Statistics				K-S 5% Critical Value			0.266597
k hat			10.70819	Data follow gamma distribution			
k star (bias corrected)			7.562402	at 5% significance level			
Theta hat			2.977809				
Theta star			4.216512	95% UCLs (Assuming Gamma Distribution)			
nu hat			214.1639	Approximate Gamma UCL			38.95169
nu star			151.248	Adjusted Gamma UCL			40.3569
Approx.Chi Square Value (.05)			123.8159				
Adjusted Level of Significance			0.0267	Lognormal Distribution Test			
Adjusted Chi Square Value			119.5047	Shapiro-Wilk Test Statisitic			0.953558
				Shapiro-Wilk 5% Critical Value			0.842
Log-transformed Statistics				Data are lognormal at 5% significance level			
Minimum of log data			2.760696				
Maximum of log data			4.014986	95% UCLs (Assuming Lognormal Distribution)			
Mean of log data			3.414778	95% H-UCL			39.91842
Standard Deviation of log data			0.326981	95% Chebyshev (MVUE) UCL			46.4
Variance of log data			0.106916	97.5% Chebyshev (MVUE) UCL			52.67312
				99% Chebyshev (MVUE) UCL			64.99545
				95% Non-parametric UCLs			
				CLT UCL			37.35165
				Adj-CLT UCL (Adjusted for skewness)			38.54045
				Mod-t UCL (Adjusted for skewness)			38.16253
				Jackknife UCL			37.9771
				Standard Bootstrap UCL			37.05713
				Bootstrap-t UCL			40.33062
RECOMMENDATION				Hall's Bootstrap UCL			49.78663
Data are normal (0.05)				Percentile Bootstrap UCL			37.19404
				BCA Bootstrap UCL			38.30238
Use Student's-t UCL				95% Chebyshev (Mean, Sd) UCL			46.36851
				97.5% Chebyshev (Mean, Sd) UCL			52.63469
				99% Chebyshev (Mean, Sd) UCL			64.94338

General Statistics

Data File					Variable:	copper; gastric; dust	
Raw Statistics				Normal Distribution Test			
Number of Valid Samples			10	Shapiro-Wilk Test Statisitic			0.934165
Number of Unique Samples			10	Shapiro-Wilk 5% Critical Value			0.842
Minimum			28.31869	Data are normal at 5% significance level			
Maximum			60.9233				
Mean			43.87219	95% UCL (Assuming Normal Distribution)			
Median			41.78701	Student			49.88132
Standard Deviation			10.36628				
Variance			107.4597	Gamma Distribution Test			
Coefficient of Variation			0.236284	A-D Test Statistic			0.341623
Skewness			0.413144	A-D 5% Critical Value			0.72455
				K-S Test Statistic			0.187024
Gamma Statistics				K-S 5% Critical Value			0.266169
k hat			20.09072	Data follow gamma distribution			
k star (bias corrected)			14.13017	at 5% significance level			
Theta hat			2.183704				
Theta star			3.104859	95% UCLs (Assuming Gamma Distribution)			
nu hat			401.8144	Approximate Gamma UCL			50.67608
nu star			282.6034	Adjusted Gamma UCL			51.98065
Approx.Chi Square Value (.05)			244.6604				
Adjusted Level of Significance			0.0267	Lognormal Distribution Test			
Adjusted Chi Square Value			238.5201	Shapiro-Wilk Test Statisitic			0.952647
				Shapiro-Wilk 5% Critical Value			0.842
Log-transformed Statistics				Data are lognormal at 5% significance level			
Minimum of log data			3.343522				
Maximum of log data			4.109616	95% UCLs (Assuming Lognormal Distribution)			
Mean of log data			3.756187	95% H-UCL			51.17355
Standard Deviation of log data			0.236687	95% Chebyshev (MVUE) UCL			58.25256
Variance of log data			0.056021	97.5% Chebyshev (MVUE) UCL			64.47385
				99% Chebyshev (MVUE) UCL			76.69437
				95% Non-parametric UCLs			
				CLT UCL			49.26419
				Adj-CLT UCL (Adjusted for skewness)			49.72181
				Mod-t UCL (Adjusted for skewness)			49.9527
				Jackknife UCL			49.88132
				Standard Bootstrap UCL			49.06797
				Bootstrap-t UCL			50.87038
RECOMMENDATION				Hall's Bootstrap UCL			49.42551
Data are normal (0.05)				Percentile Bootstrap UCL			49.18244
				BCA Bootstrap UCL			49.3617
Use Student's-t UCL				95% Chebyshev (Mean, Sd) UCL			58.16111
				97.5% Chebyshev (Mean, Sd) UCL			64.34394
				99% Chebyshev (Mean, Sd) UCL			76.48892

Data File					Variable:	copper; intestinal; dust		
Raw Statistics				Normal Distribution Test				
Number of Valid Samples			10	Shapiro-Wilk Test Statisitic				0.856122
Number of Unique Samples			10	Shapiro-Wilk 5% Critical Value				0.842
Minimum			38.27657	Data are normal at 5% significance level				
Maximum			82.77994					
Mean			57.61405	95% UCL (Assuming Normal Distribution)				
Median			50.2245	Student				67.40539
Standard Deviation			16.89091					
Variance			285.3027	Gamma Distribution Test				
Coefficient of Variation			0.293173	A-D Test Statistic				0.591854
Skewness			0.647764	A-D 5% Critical Value				0.724872
				K-S Test Statistic				0.243625
Gamma Statistics				K-S 5% Critical Value				0.26646
k hat			13.687	Data follow gamma distribution				
k star (bias corrected)			9.647569	at 5% significance level				
Theta hat			4.209399					
Theta star			5.971873	95% UCLs (Assuming Gamma Distribution)				
nu hat			273.7401	Approximate Gamma UCL				68.70256
nu star			192.9514	Adjusted Gamma UCL				70.87355
Approx.Chi Square Value (.05)			161.8093					
Adjusted Level of Significance			0.0267	Lognormal Distribution Test				
Adjusted Chi Square Value			156.8527	Shapiro-Wilk Test Statisitic				0.893038
				Shapiro-Wilk 5% Critical Value				0.842
Log-transformed Statistics				Data are lognormal at 5% significance level				
Minimum of log data			3.644838					
Maximum of log data			4.416186	95% UCLs (Assuming Lognormal Distribution)				
Mean of log data			4.016791	95% H-UCL				69.55259
Standard Deviation of log data			0.283391	95% Chebyshev (MVUE) UCL				80.18482
Variance of log data			0.08031	97.5% Chebyshev (MVUE) UCL				89.97497
				99% Chebyshev (MVUE) UCL				109.2058
				95% Non-parametric UCLs				
				CLT UCL				66.39983
				Adj-CLT UCL (Adjusted for skewness)				67.56893
				Mod-t UCL (Adjusted for skewness)				67.58775
				Jackknife UCL				67.40539
				Standard Bootstrap UCL				65.83508
				Bootstrap-t UCL				69.59033
RECOMMENDATION				Hall's Bootstrap UCL				65.10097
Data are normal (0.05)				Percentile Bootstrap UCL				66.02055
				BCA Bootstrap UCL				67.03012
Use Student's-t UCL				95% Chebyshev (Mean, Sd) UCL				80.89656
				97.5% Chebyshev (Mean, Sd) UCL				90.97092
				99% Chebyshev (Mean, Sd) UCL				110.76

General Statistics

Data File					Variable:	lead; gastric; dust	
Raw Statistics				Normal Distribution Test			
Number of Valid Samples			8	Shapiro-Wilk Test Statisitic			0.92067
Number of Unique Samples			8	Shapiro-Wilk 5% Critical Value			0.818
Minimum			72.625	Data are normal at 5% significance level			
Maximum			90.02232				
Mean			79.07904	95% UCL (Assuming Normal Distribution)			
Median			78.23623	Student			83.2492
Standard Deviation			6.225647				
Variance			38.75868	Gamma Distribution Test			
Coefficient of Variation			0.078727	A-D Test Statistic			0.308739
Skewness			0.691204	A-D 5% Critical Value			0.71473
				K-S Test Statistic			0.19821
Gamma Statistics				K-S 5% Critical Value			0.29358
k hat			188.6785	Data follow gamma distribution			
k star (bias corrected)			118.0074	at 5% significance level			
Theta hat			0.419121				
Theta star			0.670119	95% UCLs (Assuming Gamma Distribution)			
nu hat			3018.857	Approximate Gamma UCL			83.49916
nu star			1888.119	Adjusted Gamma UCL			84.67294
Approx.Chi Square Value (.05)			1788.169				
Adjusted Level of Significance			0.01946	Lognormal Distribution Test			
Adjusted Chi Square Value			1763.381	Shapiro-Wilk Test Statisitic			0.926105
				Shapiro-Wilk 5% Critical Value			0.818
Log-transformed Statistics				Data are lognormal at 5% significance level			
Minimum of log data			4.285309				
Maximum of log data			4.500058	95% UCLs (Assuming Lognormal Distribution)			
Mean of log data			4.367796	95% H-UCL			N/A
Standard Deviation of log data			0.077443	95% Chebyshev (MVUE) UCL			88.51704
Variance of log data			0.005997	97.5% Chebyshev (MVUE) UCL			92.60187
				99% Chebyshev (MVUE) UCL			100.6257
				95% Non-parametric UCLs			
				CLT UCL			82.69953
				Adj-CLT UCL (Adjusted for skewness)			83.27428
				Mod-t UCL (Adjusted for skewness)			83.33885
				Jackknife UCL			83.2492
				Standard Bootstrap UCL			82.43081
				Bootstrap-t UCL			84.31035
RECOMMENDATION				Hall's Bootstrap UCL			83.81772
Data are normal (0.05)				Percentile Bootstrap UCL			82.73127
				BCA Bootstrap UCL			83.07085
Use Student's-t UCL				95% Chebyshev (Mean, Sd) UCL			88.67341
				97.5% Chebyshev (Mean, Sd) UCL			92.8249
				99% Chebyshev (Mean, Sd) UCL			100.9797

Data File					Variable:	lead; intestinal; dust	
Raw Statistics				Normal Distribution Test			
Number of Valid Samples			10	Shapiro-Wilk Test Statisitic			0.955055
Number of Unique Samples			10	Shapiro-Wilk 5% Critical Value			0.842
Minimum			10.41614	Data are normal at 5% significance level			
Maximum			26.81065				
Mean			17.9941	95% UCL (Assuming Normal Distribution)			
Median			17.17174	Student			21.17763
Standard Deviation			5.491854				
Variance			30.16046	Gamma Distribution Test			
Coefficient of Variation			0.305203	A-D Test Statistic			0.244543
Skewness			0.145804	A-D 5% Critical Value			0.724985
				K-S Test Statistic			0.160511
Gamma Statistics				K-S 5% Critical Value			0.266563
k hat			11.46085	Data follow gamma distribution			
k star (bias corrected)			8.089259	at 5% significance level			
Theta hat			1.57005				
Theta star			2.224444	95% UCLs (Assuming Gamma Distribution)			
nu hat			229.2169	Approximate Gamma UCL			21.82757
nu star			161.7852	Adjusted Gamma UCL			22.58658
Approx.Chi Square Value (.05)			133.3717				
Adjusted Level of Significance			0.0267	Lognormal Distribution Test			
Adjusted Chi Square Value			128.8898	Shapiro-Wilk Test Statisitic			0.951988
				Shapiro-Wilk 5% Critical Value			0.842
Log-transformed Statistics				Data are lognormal at 5% significance level			
Minimum of log data			2.343356				
Maximum of log data			3.288799	95% UCLs (Assuming Lognormal Distribution)			
Mean of log data			2.845783	95% H-UCL			22.39079
Standard Deviation of log data			0.318666	95% Chebyshev (MVUE) UCL			25.99264
Variance of log data			0.101548	97.5% Chebyshev (MVUE) UCL			29.44389
				99% Chebyshev (MVUE) UCL			36.22321
				95% Non-parametric UCLs			
				CLT UCL			20.85068
				Adj-CLT UCL (Adjusted for skewness)			20.93624
				Mod-t UCL (Adjusted for skewness)			21.19097
				Jackknife UCL			21.17763
				Standard Bootstrap UCL			20.67902
				Bootstrap-t UCL			21.48249
RECOMMENDATION				Hall's Bootstrap UCL			20.85954
Data are normal (0.05)				Percentile Bootstrap UCL			20.66215
				BCA Bootstrap UCL			20.56917
Use Student's-t UCL				95% Chebyshev (Mean, Sd) UCL			25.5641
				97.5% Chebyshev (Mean, Sd) UCL			28.83964
				99% Chebyshev (Mean, Sd) UCL			35.27382

General Statistics

Data File					Variable:	nickel; gastric; dust	
Raw Statistics				Normal Distribution Test			
Number of Valid Samples			10	Shapiro-Wilk Test Statisitic			0.913999
Number of Unique Samples			10	Shapiro-Wilk 5% Critical Value			0.842
Minimum			19.13465	Data are normal at 5% significance level			
Maximum			42.96432				
Mean			31.52554	95% UCL (Assuming Normal Distribution)			
Median			29.94981	Student			36.37676
Standard Deviation			8.368782				
Variance			70.03651	Gamma Distribution Test			
Coefficient of Variation			0.26546	A-D Test Statistic			0.451339
Skewness			-0.10243	A-D 5% Critical Value			0.724821
				K-S Test Statistic			0.183125
Gamma Statistics				K-S 5% Critical Value			0.266414
k hat			14.68896	Data follow gamma distribution			
k star (bias corrected)			10.34894	at 5% significance level			
Theta hat			2.146207				
Theta star			3.046259	95% UCLs (Assuming Gamma Distribution)			
nu hat			293.7791	Approximate Gamma UCL			37.35444
nu star			206.9787	Adjusted Gamma UCL			38.49092
Approx.Chi Square Value (.05)			174.6811				
Adjusted Level of Significance			0.0267	Lognormal Distribution Test			
Adjusted Chi Square Value			169.5235	Shapiro-Wilk Test Statisitic			0.895774
				Shapiro-Wilk 5% Critical Value			0.842
Log-transformed Statistics				Data are lognormal at 5% significance level			
Minimum of log data			2.951501				
Maximum of log data			3.76037	95% UCLs (Assuming Lognormal Distribution)			
Mean of log data			3.416373	95% H-UCL			38.14544
Standard Deviation of log data			0.28314	95% Chebyshev (MVUE) UCL			43.97406
Variance of log data			0.080168	97.5% Chebyshev (MVUE) UCL			49.33961
				99% Chebyshev (MVUE) UCL			59.8792
				95% Non-parametric UCLs			
				CLT UCL			35.87855
				Adj-CLT UCL (Adjusted for skewness)			35.78695
				Mod-t UCL (Adjusted for skewness)			36.36248
				Jackknife UCL			36.37676
				Standard Bootstrap UCL			35.71195
				Bootstrap-t UCL			36.52992
RECOMMENDATION				Hall's Bootstrap UCL			35.86134
Data are normal (0.05)				Percentile Bootstrap UCL			35.59779
				BCA Bootstrap UCL			35.42175
Use Student's-t UCL				95% Chebyshev (Mean, Sd) UCL			43.06111
				97.5% Chebyshev (Mean, Sd) UCL			48.05256
				99% Chebyshev (Mean, Sd) UCL			57.8573

Data File					Variable:	nickel; intestinal; dust	
Raw Statistics				Normal Distribution Test			
Number of Valid Samples			10	Shapiro-Wilk Test Statisitic			0.927298
Number of Unique Samples			10	Shapiro-Wilk 5% Critical Value			0.842
Minimum			21.9446	Data are normal at 5% significance level			
Maximum			49.10994				
Mean			37.0896	95% UCL (Assuming Normal Distribution)			
Median			37.06545	Student			42.67152
Standard Deviation			9.629297				
Variance			92.72336	Gamma Distribution Test			
Coefficient of Variation			0.259623	A-D Test Statistic			0.405434
Skewness			-0.40384	A-D 5% Critical Value			0.724819
				K-S Test Statistic			0.15882
Gamma Statistics				K-S 5% Critical Value			0.266413
k hat			14.72284	Data follow gamma distribution			
k star (bias corrected)			10.37266	at 5% significance level			
Theta hat			2.519187				
Theta star			3.575708	95% UCLs (Assuming Gamma Distribution)			
nu hat			294.4569	Approximate Gamma UCL			43.93832
nu star			207.4532	Adjusted Gamma UCL			45.27345
Approx.Chi Square Value (.05)			175.1172				
Adjusted Level of Significance			0.0267	Lognormal Distribution Test			
Adjusted Chi Square Value			169.9529	Shapiro-Wilk Test Statisitic			0.891497
				Shapiro-Wilk 5% Critical Value			0.842
Log-transformed Statistics				Data are lognormal at 5% significance level			
Minimum of log data			3.088521				
Maximum of log data			3.894061	95% UCLs (Assuming Lognormal Distribution)			
Mean of log data			3.578991	95% H-UCL			44.99805
Standard Deviation of log data			0.285648	95% Chebyshev (MVUE) UCL			51.90321
Variance of log data			0.081595	97.5% Chebyshev (MVUE) UCL			58.27691
				99% Chebyshev (MVUE) UCL			70.79681
				95% Non-parametric UCLs			
				CLT UCL			42.09826
				Adj-CLT UCL (Adjusted for skewness)			41.68274
				Mod-t UCL (Adjusted for skewness)			42.60671
				Jackknife UCL			42.67152
				Standard Bootstrap UCL			41.83316
				Bootstrap-t UCL			42.1756
RECOMMENDATION				Hall's Bootstrap UCL			41.58577
Data are normal (0.05)				Percentile Bootstrap UCL			41.97095
				BCA Bootstrap UCL			41.61594
Use Student's-t UCL				95% Chebyshev (Mean, Sd) UCL			50.36267
				97.5% Chebyshev (Mean, Sd) UCL			56.10593
				99% Chebyshev (Mean, Sd) UCL			67.38747

Data File					Variable:	Arsenic; gastric; soil	
Raw Statistics				Normal Distribution Test			
Number of Valid Samples			32	Shapiro-Wilk Test Statisitic			0.971782
Number of Unique Samples			32	Shapiro-Wilk 5% Critical Value			0.93
Minimum			9.33	Data are normal at 5% significance level			
Maximum			43.48				
Mean			23.74688	95% UCL (Assuming Normal Distribution)			
Median			22.295	Student			26.08117
Standard Deviation			7.788029				
Variance			60.6534	Gamma Distribution Test			
Coefficient of Variation			0.32796	A-D Test Statistic			0.189524
Skewness			0.542116	A-D 5% Critical Value			0.746744
				K-S Test Statistic			0.081898
Gamma Statistics				K-S 5% Critical Value			0.155472
k hat			9.398702	Data follow gamma distribution			
k star (bias corrected)			8.538407	at 5% significance level			
Theta hat			2.526612				
Theta star			2.781183	95% UCLs (Assuming Gamma Distribution)			
nu hat			601.5169	Approximate Gamma UCL			26.30958
nu star			546.458	Adjusted Gamma UCL			26.45433
Approx.Chi Square Value (.05)			493.2299				
Adjusted Level of Significance			0.0416	Lognormal Distribution Test			
Adjusted Chi Square Value			490.531	Shapiro-Wilk Test Statisitic			0.978751
				Shapiro-Wilk 5% Critical Value			0.93
Log-transformed Statistics				Data are lognormal at 5% significance level			
Minimum of log data			2.233235				
Maximum of log data			3.772301	95% UCLs (Assuming Lognormal Distribution)			
Mean of log data			3.11331	95% H-UCL			26.66527
Standard Deviation of log data			0.342016	95% Chebyshev (MVUE) UCL			30.21404
Variance of log data			0.116975	97.5% Chebyshev (MVUE) UCL			32.98748
				99% Chebyshev (MVUE) UCL			38.43536
				95% Non-parametric UCLs			
				CLT UCL			26.01141
				Adj-CLT UCL (Adjusted for skewness)			26.15239
				Mod-t UCL (Adjusted for skewness)			26.10316
				Jackknife UCL			26.08117
				Standard Bootstrap UCL			25.99123
				Bootstrap-t UCL			26.25658
RECOMMENDATION				Hall's Bootstrap UCL			26.23927
Data are normal (0.05)				Percentile Bootstrap UCL			26.05719
				BCA Bootstrap UCL			26.05531
Use Student's-t UCL				95% Chebyshev (Mean, Sd) UCL			29.74795
				97.5% Chebyshev (Mean, Sd) UCL			32.34463
				99% Chebyshev (Mean, Sd) UCL			37.44529

Data File					Variable:	arsenic; intestinal; soil	
Raw Statistics				Normal Distribution Test			
Number of Valid Samples			33	Shapiro-Wilk Test Statisitic			0.971816
Number of Unique Samples			33	Shapiro-Wilk 5% Critical Value			0.931
Minimum			12.09	Data are normal at 5% significance level			
Maximum			53.93				
Mean			30.21182	95% UCL (Assuming Normal Distribution)			
Median			28.25	Student			33.0677
Standard Deviation			9.685271				
Variance			93.80448	Gamma Distribution Test			
Coefficient of Variation			0.320579	A-D Test Statistic			0.216871
Skewness			0.506637	A-D 5% Critical Value			0.747205
				K-S Test Statistic			0.09524
Gamma Statistics				K-S 5% Critical Value			0.153176
k hat			9.814527	Data follow gamma distribution			
k star (bias corrected)			8.942499	at 5% significance level			
Theta hat			3.078276				
Theta star			3.378454	95% UCLs (Assuming Gamma Distribution)			
nu hat			647.7588	Approximate Gamma UCL			33.33921
nu star			590.2049	Adjusted Gamma UCL			33.50866
Approx.Chi Square Value (.05)			534.8407				
Adjusted Level of Significance			0.0419	Lognormal Distribution Test			
Adjusted Chi Square Value			532.136	Shapiro-Wilk Test Statisitic			0.97792
				Shapiro-Wilk 5% Critical Value			0.931
Log-transformed Statistics				Data are lognormal at 5% significance level			
Minimum of log data			2.492379				
Maximum of log data			3.987687	95% UCLs (Assuming Lognormal Distribution)			
Mean of log data			3.356424	95% H-UCL			33.75435
Standard Deviation of log data			0.334096	95% Chebyshev (MVUE) UCL			38.11571
Variance of log data			0.11162	97.5% Chebyshev (MVUE) UCL			41.50662
				99% Chebyshev (MVUE) UCL			48.16742
				95% Non-parametric UCLs			
				CLT UCL			32.98502
				Adj-CLT UCL (Adjusted for skewness)			33.14391
				Mod-t UCL (Adjusted for skewness)			33.09248
				Jackknife UCL			33.0677
				Standard Bootstrap UCL			32.938
				Bootstrap-t UCL			33.1684
RECOMMENDATION				Hall's Bootstrap UCL			33.18124
Data are normal (0.05)				Percentile Bootstrap UCL			32.99727
				BCA Bootstrap UCL			33.00394
Use Student's-t UCL				95% Chebyshev (Mean, Sd) UCL			37.56088
				97.5% Chebyshev (Mean, Sd) UCL			40.74082
				99% Chebyshev (Mean, Sd) UCL			46.9872

Data File					Variable:	cobalt; gastric; soil	
Raw Statistics				Normal Distribution Test			
Number of Valid Samples			37	Shapiro-Wilk Test Statisitic			0.973022
Number of Unique Samples			37	Shapiro-Wilk 5% Critical Value			0.936
Minimum			12.43	Data are normal at 5% significance level			
Maximum			45.03				
Mean			25.90595	95% UCL (Assuming Normal Distribution)			
Median			25.26	Student			27.86965
Standard Deviation			7.075031				
Variance			50.05606	Gamma Distribution Test			
Coefficient of Variation			0.273105	A-D Test Statistic			0.512995
Skewness			0.128604	A-D 5% Critical Value			0.747768
				K-S Test Statistic			0.084483
Gamma Statistics				K-S 5% Critical Value			0.144862
k hat			12.80143	Data follow gamma distribution			
k star (bias corrected)			11.78149	at 5% significance level			
Theta hat			2.023676				
Theta star			2.198868	95% UCLs (Assuming Gamma Distribution)			
nu hat			947.3057	Approximate Gamma UCL			28.08149
nu star			871.8305	Adjusted Gamma UCL			28.17975
Approx.Chi Square Value (.05)			804.2876				
Adjusted Level of Significance			0.0431	Lognormal Distribution Test			
Adjusted Chi Square Value			801.4831	Shapiro-Wilk Test Statisitic			0.948108
				Shapiro-Wilk 5% Critical Value			0.936
Log-transformed Statistics				Data are lognormal at 5% significance level			
Minimum of log data			2.520113				
Maximum of log data			3.807329	95% UCLs (Assuming Lognormal Distribution)			
Mean of log data			3.214906	95% H-UCL			28.36652
Standard Deviation of log data			0.293765	95% Chebyshev (MVUE) UCL			31.52566
Variance of log data			0.086298	97.5% Chebyshev (MVUE) UCL			33.93072
				99% Chebyshev (MVUE) UCL			38.65499
				95% Non-parametric UCLs			
				CLT UCL			27.81912
				Adj-CLT UCL (Adjusted for skewness)			27.8454
				Mod-t UCL (Adjusted for skewness)			27.87375
				Jackknife UCL			27.86965
				Standard Bootstrap UCL			27.77202
				Bootstrap-t UCL			27.72441
RECOMMENDATION				Hall's Bootstrap UCL			27.89717
Data are normal (0.05)				Percentile Bootstrap UCL			27.75919
				BCA Bootstrap UCL			27.80081
Use Student's-t UCL				95% Chebyshev (Mean, Sd) UCL			30.9759
				97.5% Chebyshev (Mean, Sd) UCL			33.16968
				99% Chebyshev (Mean, Sd) UCL			37.47892

Data File					Variable:	cobalt; intestinal; soil	
Raw Statistics				Normal Distribution Test			
Number of Valid Samples			37	Shapiro-Wilk Test Statisitic			0.973247
Number of Unique Samples			37	Shapiro-Wilk 5% Critical Value			0.936
Minimum			13.57399	Data are normal at 5% significance level			
Maximum			38.1825				
Mean			22.93616	95% UCL (Assuming Normal Distribution)			
Median			22.48819	Student			24.49248
Standard Deviation			5.607276				
Variance			31.44155	Gamma Distribution Test			
Coefficient of Variation			0.244473	A-D Test Statistic			0.165226
Skewness			0.454022	A-D 5% Critical Value			0.747116
				K-S Test Statistic			0.064657
Gamma Statistics				K-S 5% Critical Value			0.144747
k hat			17.29426	Data follow gamma distribution			
k star (bias corrected)			15.91004	at 5% significance level			
Theta hat			1.32623				
Theta star			1.441616	95% UCLs (Assuming Gamma Distribution)			
nu hat			1279.775	Approximate Gamma UCL			24.57872
nu star			1177.343	Adjusted Gamma UCL			24.65242
Approx.Chi Square Value (.05)			1098.663				
Adjusted Level of Significance			0.0431	Lognormal Distribution Test			
Adjusted Chi Square Value			1095.378	Shapiro-Wilk Test Statisitic			0.981265
				Shapiro-Wilk 5% Critical Value			0.936
Log-transformed Statistics				Data are lognormal at 5% significance level			
Minimum of log data			2.608155				
Maximum of log data			3.642377	95% UCLs (Assuming Lognormal Distribution)			
Mean of log data			3.103525	95% H-UCL			24.67959
Standard Deviation of log data			0.246357	95% Chebyshev (MVUE) UCL			27.04186
Variance of log data			0.060692	97.5% Chebyshev (MVUE) UCL			28.81529
				99% Chebyshev (MVUE) UCL			32.29885
				95% Non-parametric UCLs			
				CLT UCL			24.45244
				Adj-CLT UCL (Adjusted for skewness)			24.52596
				Mod-t UCL (Adjusted for skewness)			24.50395
				Jackknife UCL			24.49248
				Standard Bootstrap UCL			24.45319
				Bootstrap-t UCL			24.65601
RECOMMENDATION				Hall's Bootstrap UCL			24.64735
Data are normal (0.05)				Percentile Bootstrap UCL			24.43697
				BCA Bootstrap UCL			24.44226
Use Student's-t UCL				95% Chebyshev (Mean, Sd) UCL			26.95433
				97.5% Chebyshev (Mean, Sd) UCL			28.69299
				99% Chebyshev (Mean, Sd) UCL			32.10826

Data File					Variable:	copper; gastric; soil	
Raw Statistics				Normal Distribution Test			
Number of Valid Samples			36	Shapiro-Wilk Test Statisitic			0.982042
Number of Unique Samples			36	Shapiro-Wilk 5% Critical Value			0.935
Minimum			12.21714	Data are normal at 5% significance level			
Maximum			77.67427				
Mean			49.59645	95% UCL (Assuming Normal Distribution)			
Median			51.00983	Student			53.67334
Standard Deviation			14.47783				
Variance			209.6075	Gamma Distribution Test			
Coefficient of Variation			0.291913	A-D Test Statistic			0.569616
Skewness			-0.3466	A-D 5% Critical Value			0.748397
				K-S Test Statistic			0.10226
Gamma Statistics				K-S 5% Critical Value			0.146822
k hat			9.526881	Data follow gamma distribution			
k star (bias corrected)			8.751492	at 5% significance level			
Theta hat			5.205948				
Theta star			5.667199	95% UCLs (Assuming Gamma Distribution)			
nu hat			685.9354	Approximate Gamma UCL			54.55247
nu star			630.1075	Adjusted Gamma UCL			54.78867
Approx.Chi Square Value (.05)			572.863				
Adjusted Level of Significance			0.0428	Lognormal Distribution Test			
Adjusted Chi Square Value			570.3933	Shapiro-Wilk Test Statisitic			0.875604
				Shapiro-Wilk 5% Critical Value			0.935
Log-transformed Statistics				Data not lognormal at 5% significance level			
Minimum of log data			2.50284				
Maximum of log data			4.352524	95% UCLs (Assuming Lognormal Distribution)			
Mean of log data			3.850519	95% H-UCL			56.09956
Standard Deviation of log data			0.361519	95% Chebyshev (MVUE) UCL			63.58218
Variance of log data			0.130696	97.5% Chebyshev (MVUE) UCL			69.41762
				99% Chebyshev (MVUE) UCL			80.88021
				95% Non-parametric UCLs			
				CLT UCL			53.56543
				Adj-CLT UCL (Adjusted for skewness)			53.41649
				Mod-t UCL (Adjusted for skewness)			53.65011
				Jackknife UCL			53.67334
				Standard Bootstrap UCL			53.49661
				Bootstrap-t UCL			53.4585
RECOMMENDATION				Hall's Bootstrap UCL			53.503
Data are normal (0.05)				Percentile Bootstrap UCL			53.50444
				BCA Bootstrap UCL			53.1169
Use Student's-t UCL				95% Chebyshev (Mean, Sd) UCL			60.11435
				97.5% Chebyshev (Mean, Sd) UCL			64.66545
				99% Chebyshev (Mean, Sd) UCL			73.60521

Data File					Variable:	copper; intestinal; soil	
Raw Statistics				Normal Distribution Test			
Number of Valid Samples			36	Shapiro-Wilk Test Statisitic			0.964047
Number of Unique Samples			36	Shapiro-Wilk 5% Critical Value			0.935
Minimum			13.24	Data are normal at 5% significance level			
Maximum			92.49				
Mean			60.96688	95% UCL (Assuming Normal Distribution)			
Median			61.12	Student			65.21709
Standard Deviation			15.0933				
Variance			227.8076	Gamma Distribution Test			
Coefficient of Variation			0.247565	A-D Test Statistic			1.17197
Skewness			-0.68676	A-D 5% Critical Value			0.747916
				K-S Test Statistic			0.179801
Gamma Statistics				K-S 5% Critical Value			0.146731
k hat			12.04061	Data do not follow gamma distribution			
k star (bias corrected)			11.05574	at 5% significance level			
Theta hat			5.063438				
Theta star			5.514498	95% UCLs (Assuming Gamma Distribution)			
nu hat			866.9239	Approximate Gamma UCL			66.34136
nu star			796.0136	Adjusted Gamma UCL			66.59593
Approx.Chi Square Value (.05)			731.5266				
Adjusted Level of Significance			0.0428	Lognormal Distribution Test			
Adjusted Chi Square Value			728.7303	Shapiro-Wilk Test Statisitic			0.779402
				Shapiro-Wilk 5% Critical Value			0.935
Log-transformed Statistics				Data not lognormal at 5% significance level			
Minimum of log data			2.583243				
Maximum of log data			4.527101	95% UCLs (Assuming Lognormal Distribution)			
Mean of log data			4.06823	95% H-UCL			68.33003
Standard Deviation of log data			0.331735	95% Chebyshev (MVUE) UCL			76.8354
Variance of log data			0.110048	97.5% Chebyshev (MVUE) UCL			83.40144
				99% Chebyshev (MVUE) UCL			96.29917
				95% Non-parametric UCLs			
				CLT UCL			65.10459
				Adj-CLT UCL (Adjusted for skewness)			64.79694
				Mod-t UCL (Adjusted for skewness)			65.1691
				Jackknife UCL			65.21709
				Standard Bootstrap UCL			65.0003
				Bootstrap-t UCL			64.92344
RECOMMENDATION				Hall's Bootstrap UCL			64.96173
Data are normal (0.05)				Percentile Bootstrap UCL			65.05362
				BCA Bootstrap UCL			64.57953
Use Student's-t UCL				95% Chebyshev (Mean, Sd) UCL			71.93191
				97.5% Chebyshev (Mean, Sd) UCL			76.67648
				99% Chebyshev (Mean, Sd) UCL			85.99628

Data File					Variable:	lead; gastric; soil	
Raw Statistics				Normal Distribution Test			
Number of Valid Samples			37	Shapiro-Wilk Test Statisitic			0.987298
Number of Unique Samples			37	Shapiro-Wilk 5% Critical Value			0.936
Minimum			36.52989	Data are normal at 5% significance level			
Maximum			93.00202				
Mean			62.16313	95% UCL (Assuming Normal Distribution)			
Median			63.08156	Student			65.58298
Standard Deviation			12.32139				
Variance			151.8167	Gamma Distribution Test			
Coefficient of Variation			0.198211	A-D Test Statistic			0.245585
Skewness			0.190681	A-D 5% Critical Value			0.746442
				K-S Test Statistic			0.092502
Gamma Statistics				K-S 5% Critical Value			0.144649
k hat			25.48889	Data follow gamma distribution			
k star (bias corrected)			23.44024	at 5% significance level			
Theta hat			2.438832				
Theta star			2.651983	95% UCLs (Assuming Gamma Distribution)			
nu hat			1886.178	Approximate Gamma UCL			65.79511
nu star			1734.578	Adjusted Gamma UCL			65.95693
Approx.Chi Square Value (.05)			1638.827				
Adjusted Level of Significance			0.0431	Lognormal Distribution Test			
Adjusted Chi Square Value			1634.806	Shapiro-Wilk Test Statisitic			0.98133
				Shapiro-Wilk 5% Critical Value			0.936
Log-transformed Statistics				Data are lognormal at 5% significance level			
Minimum of log data			3.598131				
Maximum of log data			4.532621	95% UCLs (Assuming Lognormal Distribution)			
Mean of log data			4.110017	95% H-UCL			66.01514
Standard Deviation of log data			0.204031	95% Chebyshev (MVUE) UCL			71.36168
Variance of log data			0.041629	97.5% Chebyshev (MVUE) UCL			75.32855
				99% Chebyshev (MVUE) UCL			83.12069
				95% Non-parametric UCLs			
				CLT UCL			65.49498
				Adj-CLT UCL (Adjusted for skewness)			65.56283
				Mod-t UCL (Adjusted for skewness)			65.59357
				Jackknife UCL			65.58298
				Standard Bootstrap UCL			65.36652
				Bootstrap-t UCL			65.70629
RECOMMENDATION				Hall's Bootstrap UCL			65.77323
Data are normal (0.05)				Percentile Bootstrap UCL			65.5749
				BCA Bootstrap UCL			65.35588
Use Student's-t UCL				95% Chebyshev (Mean, Sd) UCL			70.99262
				97.5% Chebyshev (Mean, Sd) UCL			74.81315
				99% Chebyshev (Mean, Sd) UCL			82.31783

Data File					Variable:	lead; intestinal; soil	
Raw Statistics				Normal Distribution Test			
Number of Valid Samples			37	Shapiro-Wilk Test Statisitic			0.852361
Number of Unique Samples			37	Shapiro-Wilk 5% Critical Value			0.936
Minimum			7.184894	Data not normal at 5% significance level			
Maximum			36.10031				
Mean			14.35341	95% UCL (Assuming Normal Distribution)			
Median			12.76516	Student's-t UCL			15.88295
Standard Deviation			5.510778				
Variance			30.36867	Gamma Distribution Test			
Coefficient of Variation			0.383935	A-D Test Statistic			0.521384
Skewness			1.935794	A-D 5% Critical Value			0.74876
				K-S Test Statistic			0.122167
Gamma Statistics				K-S 5% Critical Value			0.145048
k hat			8.701312	Data follow gamma distribution			
k star (bias corrected)			8.013819	at 5% significance level			
Theta hat			1.649569				
Theta star			1.791083	95% UCLs (Assuming Gamma Distribution)			
nu hat			643.8971	Approxi			15.8354
nu star			593.0226	Adjusted Gamma UCL			15.90301
Approx.Chi Square Value (.05)			537.5235				
Adjusted Level of Significance			0.0431	Lognormal Distribution Test			
Adjusted Chi Square Value			535.2383	Shapiro-Wilk Test Statisitic			0.972254
				Shapiro-Wilk 5% Critical Value			0.936
Log-transformed Statistics				Data are lognormal at 5% significance level			
Minimum of log data			1.971981				
Maximum of log data			3.586301	95% UCLs (Assuming Lognormal Distribution)			
Mean of log data			2.605426	95% H-UCL			15.83702
Standard Deviation of log data			0.335213	95% Chebyshev (MVUE) UCL			17.80534
Variance of log data			0.112368	97.5% Chebyshev (MVUE) UCL			19.32363
				99% Chebyshev (MVUE) UCL			22.30602
				95% Non-parametric UCLs			
				CLT UCL			15.84359
				Adj-CLT UCL (Adjusted for skewness)			16.15167
				Mod-t UCL (Adjusted for skewness)			15.93101
				Jackknife UCL			15.88295
				Standard Bootstrap UCL			15.85044
				Bootstrap-t UCL			16.42304
RECOMMENDATION				Hall's Bootstrap UCL			16.69332
Data follow gamma distribution (0.05)				Percentile Bootstrap UCL			15.93553
				BCA Bootstrap UCL			16.32868
Use Approximate Gamma UCL				95% Chebyshev (Mean, Sd) UCL			18.30243
				97.5% Chebyshev (Mean, Sd) UCL			20.01117
				99% Chebyshev (Mean, Sd) UCL			23.36766

Data File					Variable:	nickel; gastric; soil	
Raw Statistics				Normal Distribution Test			
Number of Valid Samples			37	Shapiro-Wilk Test Statisitic			0.934108
Number of Unique Samples			37	Shapiro-Wilk 5% Critical Value			0.936
Minimum			14.55457	Data not normal at 5% significance level			
Maximum			74.58463				
Mean			34.9965	95% UCL (Assuming Normal Distribution)			
Median			30.37674	Student's-t UCL			38.51398
Standard Deviation			12.67312				
Variance			160.6079	Gamma Distribution Test			
Coefficient of Variation			0.362125	A-D Test Statistic			0.489182
Skewness			0.913675	A-D 5% Critical Value			0.748953
				K-S Test Statistic			0.138533
Gamma Statistics				K-S 5% Critical Value			0.145086
k hat			8.274897	Data follow gamma distribution			
k star (bias corrected)			7.621977	at 5% significance level			
Theta hat			4.229237				
Theta star			4.591525	95% UCLs (Assuming Gamma Distribution)			
nu hat			612.3424	Approxi			38.7091
nu star			564.0263	Adjusted Gamma UCL			38.87872
Approx.Chi Square Value (.05)			509.9304				
Adjusted Level of Significance			0.0431	Lognormal Distribution Test			
Adjusted Chi Square Value			507.7057	Shapiro-Wilk Test Statisitic			0.976409
				Shapiro-Wilk 5% Critical Value			0.936
Log-transformed Statistics				Data are lognormal at 5% significance level			
Minimum of log data			2.677905				
Maximum of log data			4.311934	95% UCLs (Assuming Lognormal Distribution)			
Mean of log data			3.493609	95% H-UCL			39.08
Standard Deviation of log data			0.357318	95% Chebyshev (MVUE) UCL			44.19457
Variance of log data			0.127676	97.5% Chebyshev (MVUE) UCL			48.16893
				99% Chebyshev (MVUE) UCL			55.97581
				95% Non-parametric UCLs			
				CLT UCL			38.42346
				Adj-CLT UCL (Adjusted for skewness)			38.75785
				Mod-t UCL (Adjusted for skewness)			38.56613
				Jackknife UCL			38.51398
				Standard Bootstrap UCL			38.44345
				Bootstrap-t UCL			38.85761
RECOMMENDATION				Hall's Bootstrap UCL			38.88521
Data follow gamma distribution (0.05)				Percentile Bootstrap UCL			38.41066
				BCA Bootstrap UCL			38.79033
Use Approximate Gamma UCL				95% Chebyshev (Mean, Sd) UCL			44.07803
				97.5% Chebyshev (Mean, Sd) UCL			48.00762
				99% Chebyshev (Mean, Sd) UCL			55.72654

Data File					Variable:	Nickel; intestinal; soil	
Raw Statistics				Normal Distribution Test			
Number of Valid Samples			37	Shapiro-Wilk Test Statisitic			0.942603
Number of Unique Samples			37	Shapiro-Wilk 5% Critical Value			0.936
Minimum			15.23243	Data are normal at 5% significance level			
Maximum			70.85649				
Mean			34.74928	95% UCL (Assuming Normal Distribution)			
Median			31.98191	Student			38.13849
Standard Deviation			12.21096				
Variance			149.1075	Gamma Distribution Test			
Coefficient of Variation			0.351402	A-D Test Statistic			0.377126
Skewness			0.864606	A-D 5% Critical Value			0.748724
				K-S Test Statistic			0.114555
Gamma Statistics				K-S 5% Critical Value			0.145041
k hat			8.781307	Data follow gamma distribution			
k star (bias corrected)			8.087327	at 5% significance level			
Theta hat			3.957188				
Theta star			4.296757	95% UCLs (Assuming Gamma Distribution)			
nu hat			649.8167	Approximate Gamma UCL			38.31949
nu star			598.4622	Adjusted Gamma UCL			38.48232
Approx.Chi Square Value (.05)			542.7038				
Adjusted Level of Significance			0.0431	Lognormal Distribution Test			
Adjusted Chi Square Value			540.4074	Shapiro-Wilk Test Statisitic			0.980102
				Shapiro-Wilk 5% Critical Value			0.936
Log-transformed Statistics				Data are lognormal at 5% significance level			
Minimum of log data			2.723427				
Maximum of log data			4.260657	95% UCLs (Assuming Lognormal Distribution)			
Mean of log data			3.49014	95% H-UCL			38.64505
Standard Deviation of log data			0.346108	95% Chebyshev (MVUE) UCL			43.5746
Variance of log data			0.11979	97.5% Chebyshev (MVUE) UCL			47.39078
				99% Chebyshev (MVUE) UCL			54.88693
				95% Non-parametric UCLs			
				CLT UCL			38.05127
				Adj-CLT UCL (Adjusted for skewness)			38.35617
				Mod-t UCL (Adjusted for skewness)			38.18604
				Jackknife UCL			38.13849
				Standard Bootstrap UCL			37.92254
				Bootstrap-t UCL			38.48787
RECOMMENDATION				Hall's Bootstrap UCL			38.59913
Data are normal (0.05)				Percentile Bootstrap UCL			38.04564
				BCA Bootstrap UCL			38.37925
Use Student's-t UCL				95% Chebyshev (Mean, Sd) UCL			43.49964
				97.5% Chebyshev (Mean, Sd) UCL			47.28592
				99% Chebyshev (Mean, Sd) UCL			54.72335

Data File					Variable:	selenium; gastric; soil	
Raw Statistics				Normal Distribution Test			
Number of Valid Samples			6	Shapiro-Wilk Test Statisitic			0.88004
Number of Unique Samples			6	Shapiro-Wilk 5% Critical Value			0.788
Minimum			0.945851	Data are normal at 5% significance level			
Maximum			14.26042				
Mean			7.362091	95% UCL (Assuming Normal Distribution)			
Median			7.020318	Student			12.20878
Standard Deviation			5.891622				
Variance			34.71121	Gamma Distribution Test			
Coefficient of Variation			0.800265	A-D Test Statistic			0.476891
Skewness			0.125836	A-D 5% Critical Value			0.712072
				K-S Test Statistic			0.232465
Gamma Statistics				K-S 5% Critical Value			0.339442
k hat			1.207129	Data follow gamma distribution			
k star (bias corrected)			0.714676	at 5% significance level			
Theta hat			6.098844				
Theta star			10.30131	95% UCLs (Assuming Gamma Distribution)			
nu hat			14.48555	Approximate Gamma UCL			20.55089
nu star			8.576107	Adjusted Gamma UCL			31.37478
Approx.Chi Square Value (.05)			3.07228				
Adjusted Level of Significance			0.01222	Lognormal Distribution Test			
Adjusted Chi Square Value			2.012383	Shapiro-Wilk Test Statisitic			0.827543
				Shapiro-Wilk 5% Critical Value			0.788
Log-transformed Statistics				Data are lognormal at 5% significance level			
Minimum of log data			-0.05567				
Maximum of log data			2.657488	95% UCLs (Assuming Lognormal Distribution)			
Mean of log data			1.528057	95% H-UCL			161.8246
Standard Deviation of log data			1.225548	95% Chebyshev (MVUE) UCL			25.56636
Variance of log data			1.501968	97.5% Chebyshev (MVUE) UCL			33.07267
				99% Chebyshev (MVUE) UCL			47.81738
				95% Non-parametric UCLs			
				CLT UCL			11.31837
				Adj-CLT UCL (Adjusted for skewness)			11.4504
				Mod-t UCL (Adjusted for skewness)			12.22937
				Jackknife UCL			12.20878
				Standard Bootstrap UCL			11.0001
				Bootstrap-t UCL			12.48727
RECOMMENDATION				Hall's Bootstrap UCL			12.32465
Data are normal (0.05)				Percentile Bootstrap UCL			10.96658
				BCA Bootstrap UCL			10.91981
Use Student's-t UCL				95% Chebyshev (Mean, Sd) UCL			17.84631
				97.5% Chebyshev (Mean, Sd) UCL			22.38284
				99% Chebyshev (Mean, Sd) UCL			31.29397

Data File					Variable:	selenium; intestinal; soil		
Raw Statistics				Normal Distribution Test				
Number of Valid Samples			4	Shapiro-Wilk Test Statisitic				0.987083
Number of Unique Samples			4	Shapiro-Wilk 5% Critical Value				0.748
Minimum			10.54	Data are normal at 5% significance level				
Maximum			33.46956					
Mean			21.07235	95% UCL (Assuming Normal Distribution)				
Median			20.13991	Student				32.60062
Standard Deviation			9.797276					
Variance			95.98662	Gamma Distribution Test				
Coefficient of Variation			0.464935	A-D Test Statistic				0.192111
Skewness			0.478474	A-D 5% Critical Value				0.658677
				K-S Test Statistic				0.164134
Gamma Statistics				K-S 5% Critical Value				0.395714
k hat			5.915195	Data follow gamma distribution				
k star (bias corrected)			1.645465	at 5% significance level				
Theta hat			3.562409					
Theta star			12.80631	95% UCLs (Assuming Gamma Distribution)				
nu hat			47.32156	Approximate Gamma UCL				46.21725
nu star			13.16372	Adjusted Gamma UCL				N/A
Approx.Chi Square Value (.05)			6.001882					
Adjusted Level of Significance			N/A	Lognormal Distribution Test				
Adjusted Chi Square Value			N/A	Shapiro-Wilk Test Statisitic				0.994899
				Shapiro-Wilk 5% Critical Value				0.748
Log-transformed Statistics				Data are lognormal at 5% significance level				
Minimum of log data			2.355178					
Maximum of log data			3.510636	95% UCLs (Assuming Lognormal Distribution)				
Mean of log data			2.961059	95% H-UCL				81.59757
Standard Deviation of log data			0.491572	95% Chebyshev (MVUE) UCL				43.33504
Variance of log data			0.241643	97.5% Chebyshev (MVUE) UCL				52.94873
				99% Chebyshev (MVUE) UCL				71.83296
				95% Non-parametric UCLs				
				CLT UCL				29.12989
				Adj-CLT UCL (Adjusted for skewness)				30.38212
				Mod-t UCL (Adjusted for skewness)				32.79594
				Jackknife UCL				32.60062
				Standard Bootstrap UCL				N/R
				Bootstrap-t UCL				N/R
RECOMMENDATION				Hall's Bootstrap UCL				N/R
Data are normal (0.05)				Percentile Bootstrap UCL				N/R
				BCA Bootstrap UCL				N/R
Use Student's-t UCL				95% Chebyshev (Mean, Sd) UCL				42.42501
				97.5% Chebyshev (Mean, Sd) UCL				51.66433
				99% Chebyshev (Mean, Sd) UCL				69.81318