Barr Engineering Company
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Technical Memorandum

To: Jim Scott, PolyMet Mining, Inc
From: Don E. Richard
Subject: TB-1 Preliminary Results of Site-Specific Soil Sorption Tests: Tailings Basin Area
Date: June 24, 2009
Project: 23/69-862-006-001
c: John Borovsky, Tina Pint

Introduction

The purpose of this memo is to outline the procedures that were completed to develop site-specific sorption factors (K_d) for arsenic, copper, nickel, and antimony with unconsolidated aquifer material from north of the Tailings Basin area of the NorthMet Plant Site, and to provide a preliminary summary of the results of this work. Analytical work for these tests is still being validated and some of the results presented in this memo may be revised based on the final review of the entire data set and the associated quality assurance data.

Background

Groundwater fate and transport modeling at the Tailings Basin was used to estimate potential long-term impacts on groundwater quality from the NorthMet operation. The result of that effort showed groundwater quality would stay below the applicable groundwater standards, provided conservative (i.e. towards the low end of available ranges) assumptions on the sorptive behavior of the existing soils were considered in the modeling. Conservative K_d values for the unconsolidated aquifer materials were selected from published values reported in literature with emphasis on values summarized in a recent U.S. EPA literature review of partition coefficients for metals (U.S. EPA, 1996; U.S. EPA, 2005).

The range of potential K_d values for any individual parameter in a specific soil varies based on several factors including the soil grain size, pH, oxidation-reduction potential, percent of organic matter, and the percentage of iron oxides. This variability is evident by the wide range of K_d values reported in the literature and was the basis for selecting conservative (low) initial sorption values for the groundwater transport modeling. The conservative values provided adequate sorption to limit the migration of all

chemicals of concern with the exception of arsenic, which was projected to exceed the groundwater quality standard at the EIS evaluation point (i.e. the property boundary) north of the Tailings Basin by a factor of two. Using site-specific data on the soil conditions (grain size, pH, iron oxide content) from overburden samples collected at the Mine Site and assumed to be similar to soils at the Tailings Basin, a more representative K_d value for arsenic was estimated. The estimated value (based on site specific soil parameters) of approximately 444 L/kg was 18 times higher than the conservative screening value but still well below both the mean and median K_d values identified in the literature and published by the U.S. EPA. The actual minimum value needed to comply with water quality standards for arsenic, using the 2008 groundwater model, was calculated to be approximately 200 L/kg, half of the estimated site-specific value. Ongoing revisions to the groundwater flow model are likely to further reduce the minimum K_d value required to comply with water quality standards in groundwater at the property boundary.

To evaluate whether the modeled K_d value for arsenic is representative for the purpose of groundwater modeling for the NorthMet Project, site-specific values for the sorption of arsenic and three other parameters of interest – antimony, copper, and nickel – onto site soil have been developed using laboratory testing procedures, which are based on ASTM methods and described in the following sections. PolyMet initiated this sampling and testing program to provide more representative site-specific sorption values to support the preparation of the Draft EIS.

Methods

Soil Sample Collection

Soil samples were collected using rotosonic soil boring techniques. Two borings at the Tailings Basin (GW-009 and RS-21) were advanced through the unconsolidated, saturated aquifer sediments (See Figure 1). The results for parallel testing at the Mine Site are reported in a separate technical memorandum. Soil samples were logged in the field by a Barr geologist and samples for sorption testing were containerized for use in the laboratory sorption testing. In the field, soil samples were kept saturated to the extent practical and containerized in air-tight containers filled completely with sediments and site groundwater to minimize changes in field conditions (pH, redox) to the extent practical. Boring logs are included in Attachment 1. At least two soil samples were collected at each boring location and then one sample (the sample from the most permeable zone based on visual observation) was selected from each location (GW-009 and RS-21) for use in the laboratory testing process described below.

Batch Sorption Tests

Batch sorption tests were conducted in the laboratory. The procedures used for the batch sorption tests were generally consistent with those described in ASTM D4319-93: *Standard Test Method for Distribution Ratios by the Short-Term Bath Method*, with some modifications as described in the summary compiled by Legend Technical Services (Attachment 2– not available at publication).

For each soil sample, a total of 60 (3 by 4 by 5 as described below) batch sorption tests were prepared. The change in aqueous concentration of each chemical of concern was analyzed in triplicate (3) sorption test vials over a range of four (4) time steps (2 days, 4 days, 6 days and 8 days) for five (5) different challenge solutions. At the end of each time interval, five batch tests per soil (in triplicate) were sacrificed for analysis of the chemicals of concern remaining in the liquid portion of the sorption test. As each batch sorption test was sacrificed, it was decanted to remove most of the suspended particulate matter, filtered using a 0.45 micron filter, and analyzed using ICP or ICP-MS methods for analysis of metals and inorganics as described in U.S. EPA Method 6020.

Challenge Solutions

The five different initial target concentrations for the chemicals of potential concern used in the challenge solutions are listed in Table 1.

Table 1
Challenge Solution Target Concentrations

Parameter	Target Concentration in Challenge Solution (μg/L)				
	AA	BB	CC	DD	EE
Arsenic	5	10	50	100	500
Antimony	5	10	25	50	100
Copper	50	100	500	1,000	2,500
Nickel	50	100	500	1,000	5,000

These ranges were selected to span both the groundwater quality standards and the modeled maximum values in the groundwater seepage. For the tailings basin seepage, the maximum modeled concentrations for arsenic, antimony, copper and nickel were 28, 12, 14, and 27 μg/L respectively. The high range in

this test protocol was approximately one order of magnitude above the likely values and was included to determine if the sorption capacity of the soils could be exceeded.

The five challenge solutions were prepared using groundwater from Monitoring Well GW-009 to the north of the tailings basin. The water was pumped directly from the well to sample containers that were filled completely (no headspace) and transported immediately to the laboratory on ice. In the laboratory, the site groundwater and the challenge solutions that were prepared using this water were maintained with a nitrogen headspace to minimize changes to the overall chemistry of the water.

The five challenge solutions were prepared by adding a known quantity of a certified reference standard to the site groundwater. Reference solutions were prepared from acidified stocks in a method intended to minimize changes to the pH of the challenge solutions while achieving the target concentrations listed in Table 1. Because the four parameters were derived from different reference stocks, some changes occurred during the preparation process. The initial solution values for each sorption test were determined by analysis of a portion of the material added to each test bottle.

Results

The results of the concentrations of the four parameters of concern in the initial and final solutions for each test bottle are summarized in Attachment 3. For each individual sample test, an approximate one-point sorption value (reported as R_d) is included in the analytical summary. In general, R_d values should be similar to K_d, but will have greater variability, while K_d represents a linear regression of the sorption data.

The units of K_d were calculated as L/Kg for comparison to U.S. EPA published sorption factors (U.S. EPA, 1996; U.S. EPA, 2005). The sorption values for each parameter and for each soil are summarized in Table 2 along with the U.S. EPA recommended screening levels used in the groundwater modeling at the EIS evaluation point.

Table 2
Site-Specific Sorption (K_d) Values
(Units = L/Kg)

Parameter	U.S. EPA K_d Screening Values	Site Specific Sorption Factor (K_d)		
		GW-009	RS-21	Average
Arsenic	25	297	105	201
Antimony	45	15.4[2]	5.5[2]	10.4
Copper	22	257	344	300
Nickel	16	39	16	27
Notes:	1. No sorption was required for copper or nickel to achieve groundwater standards at the evaluation point north of the tailings basin. 2. Sorption factors are based on slopes excluding the EE solution. The linear relationship between sorbed and solute concentrations was not maintained at the higher concentrations in the EE challenge solution, which likely reflects the filling of some sorption sites and the formation of secondary surface complexes. See Figures 4 and 7 for arsenic and antimony respectively.			

In general, the sorption factor represent the ratio of the concentration of chemical sorbed to the soil material in the batch samples compared to the corresponding concentration of chemical in the in the water portion of the batch experiments, where the concentration of the chemical in the water sample was measured and the mass sorbed to the soil was calculated by mass balance.

Using these two values the value of K_d is:

$$K_d = \frac{\text{Sorbed concentration (mg/Kg)}}{\text{Dissolved concentration (mg/L)}}$$

Over a range of initial concentrations, K_d is the linear slope of the line obtained from plotting the solute concentrations on the x axis and the corresponding concentration sorbed to the soil on the y axis. A linear relationship is generally observed provided the sorptive capacity of the soil is not exceeded. When the sorptive capacity of the soil is exceeded, the correlation between the mass of chemical sorbed and in solution is no longer linear. If sorption measurements at concentrations above the sorptive capacity of the soil are included, this would result in a decrease in the slope of the line and an underestimation of K_d.

For site-specific sorption values, K_d is the slope of the linear portion of correlation between the mass of chemical sorbed and in solution, provided the site-specific groundwater values are within the linear sorption range of challenge solutions. Because the projected values for arsenic, antimony, copper and nickel in the groundwater near the Tailings Basin are all at the low end of the concentration ranges used in this study, multiple potential slopes can be calculated by using values at the low end of the range or

values from the entire range of the experiments. Using the entire data range would provide the most conservative value, but may result in an underestimation of K_d if the sorptive capacity of the soil is exceeded, as described above. For the analysis described below, the K_d values were initially calculated using all available data. When the initial correlation of the data suggested that linear relationship between sorbed and solute concentrations was not maintained at higher concentrations, one or more data points from the most concentrated challenge solution were removed from the calculation to determine if linearity improved. The values in Table 2 are the slope of the line for the longest running data set (192, 144, 96, or 48-hour) that is still linear and still includes challenge solutions covering the likely range of concentrations anticipated at the site. This is representative of the site conditions because the groundwater will be flowing a long distance (ie time) between the facility and compliance point.

In general, sorption continued to increase with each time step and in some cases reached the point where sorption did not increase with the time step.

Arsenic Sorption

The soil sample from GW-009 (See Figure 2) sorbed arsenic with a K_d value of at least 297 L/kg based on the results from the 144-hour data (that is, based on the slope of the best fit line through data collected after 144-hours). Sorption was still increasing with time for the 192-hour samples, but arsenic was not detectable in most of the challenge solutions after 192 hours suggesting nearly complete sorption and preventing the calculation of an accurate slope to represent K_d.

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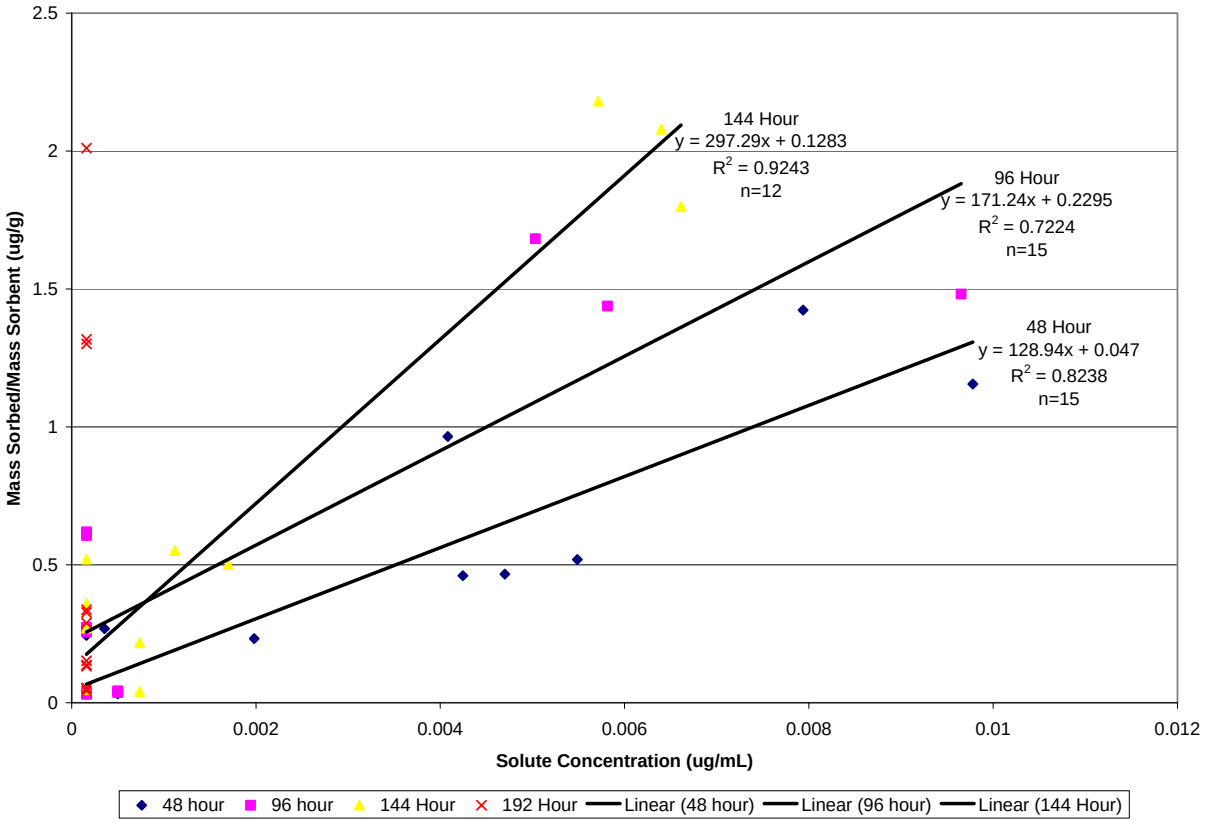


Figure 2: Arsenic Sorption (K_d) at GW-009

The soil from RS-21 shows a similar trend to GW-009 soil with time, but with generally lower sorption. Using the available 192-hour test data from all five challenge solutions (see Figure 3), the calculated slope for site-specific sorption (51 L/Kg) at RS-21 is approximately two times higher than the U.S. EPA screening value listed in Table 2. However, the mass vs. solute curves for all the time-steps tested show a general decrease in sorption at the highest concentration, suggesting that the that linear relationship between sorbed and solute concentrations was not maintained at higher concentrations in the EE solution. Calculating the slopes with only the four lowest concentrations (challenge solutions AA through DD) shows a general improvement in linearity of the 48-hour test data and increased predictions for sorption for the 48, 96 and 144-hour test data (Figure 4). Because the highest arsenic concentration expected at the Tailings Basin site (28 ug/L) is more than an order of magnitude below the initial concentrations for challenge solution EE (500 ug/L) and well within the range of concentrations in solutions AA (5 ug/L) through DD (100 ug/L), the AA through DD data are a reasonable representation of the arsenic sorption at

location RS-21. The soil sample from RS-21 (see Figure 2) sorbed arsenic with a K_d value of 105 L/kg based on the results from the 144-hour data (that is, based on the slope of the best fit line through data collected after 144-hours).

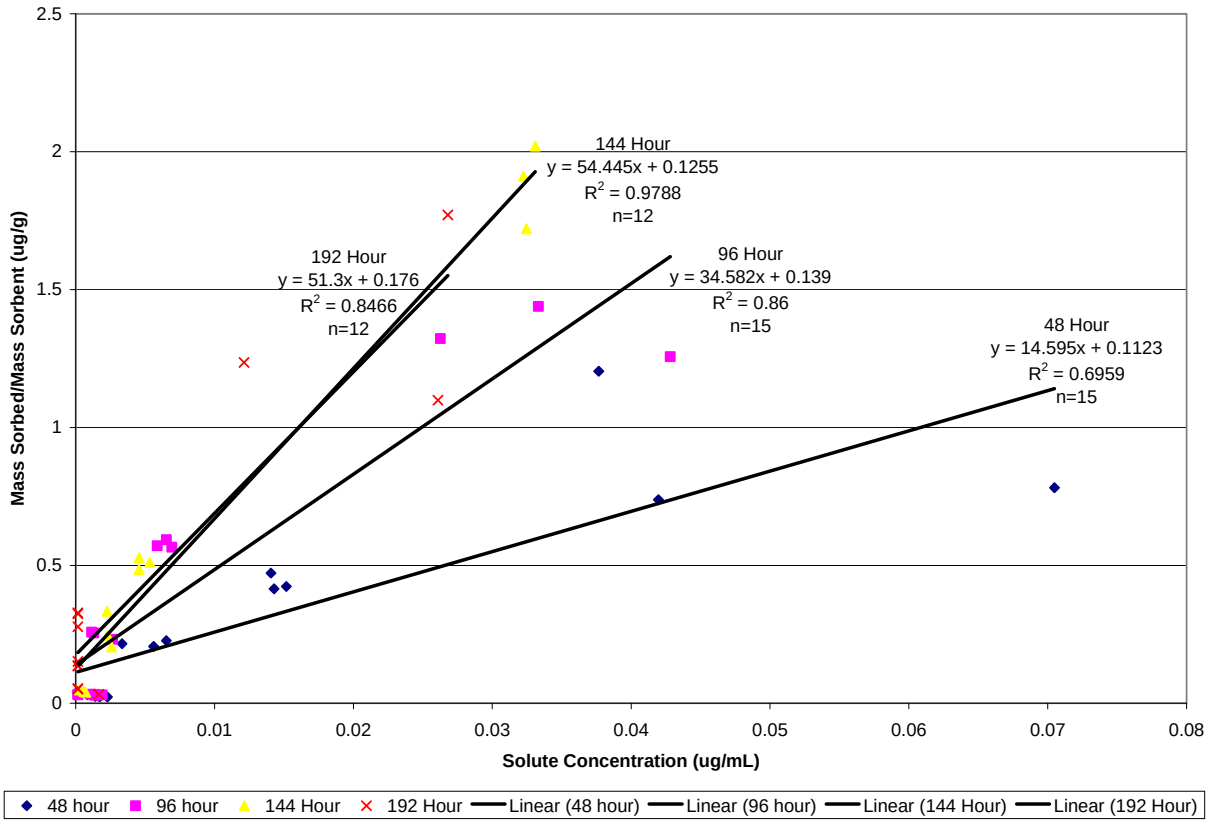


Figure 3: Arsenic Sorption (K_d) at RS-21

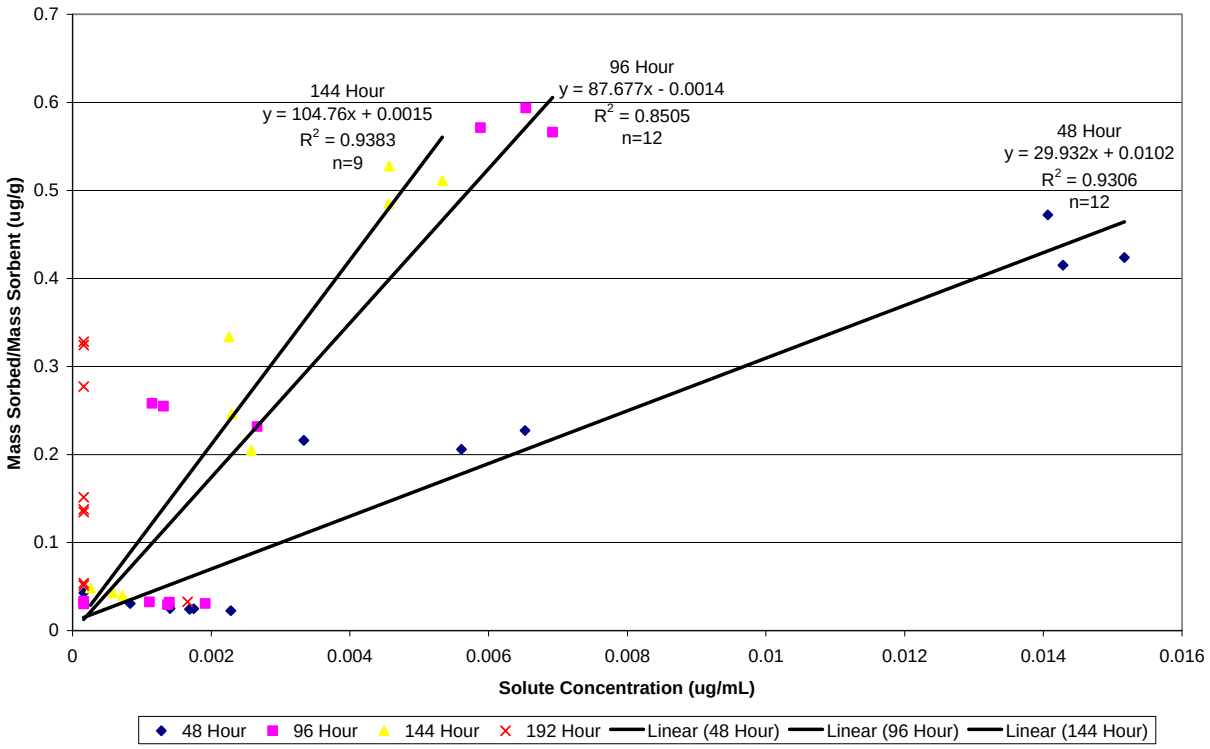


Figure 4: Arsenic Sorption (K_d) at RS-21 for Challenge Solution Samples AA-DD

Antimony Sorption

For antimony, the K_d values listed in Table 2 are calculated from the linear correlation of the results of the sorption tests for solutions AA through DD (See Figures 5 and 6). The values listed in Table 2 represent the slope of the 192-hour data set for each of these locations

Preliminary plots of the antimony sorption test results with all of the available initial concentrations (solutions AA through EE) resulted in significantly lower estimates of the linear slope. This suggests that for antimony, the higher initial concentration in challenge solution EE is likely in the range where the linear relationship between sorbed and solute concentrations was maintained. As with arsenic, the initial concentration of antimony in solution EE is approximately an order of magnitude greater than the anticipated maximum concentration at the site (12 ug/L), which is well within the range of concentrations in solutions AA (5 ug/L) through DD (50 ug/L). Thus, it is appropriate to use only challenge solutions AA through DD to calculate the site-specific sorption value for antimony.

In general, the antimony sorption factors are somewhat low relative the U.S. EPA screening values. This may suggest that the soil has limited sorption capacity for antimony, or that the antimony sorption process is slower than that for arsenic – as the antimony sorption values were still increasing at 192 hours. However, this may also suggest some competition with other parameters for sorption sites, most likely arsenic because of their similar oxyanion structure. The calculated sorption factor for antimony is lower than the screening value.

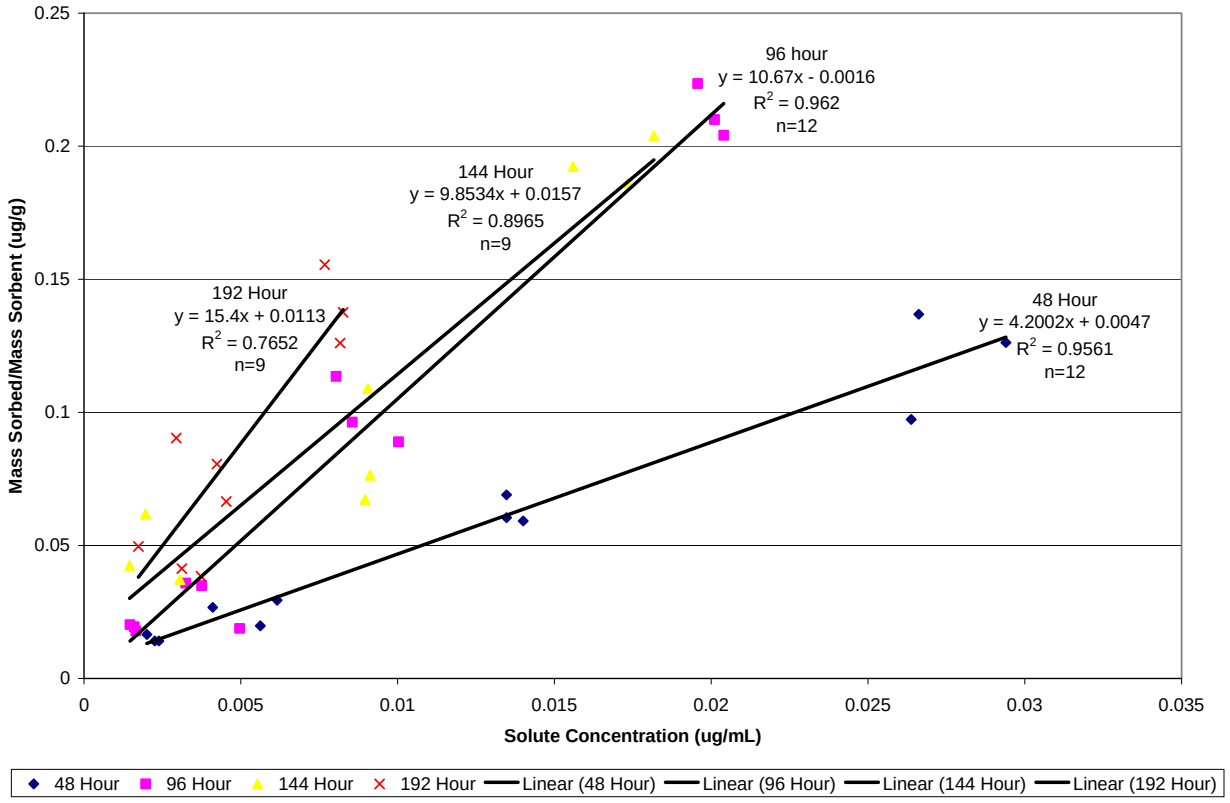


Figure 5: Antimony Sorption (K_d) at GW-009 for Challenge Solution Samples AA-DD

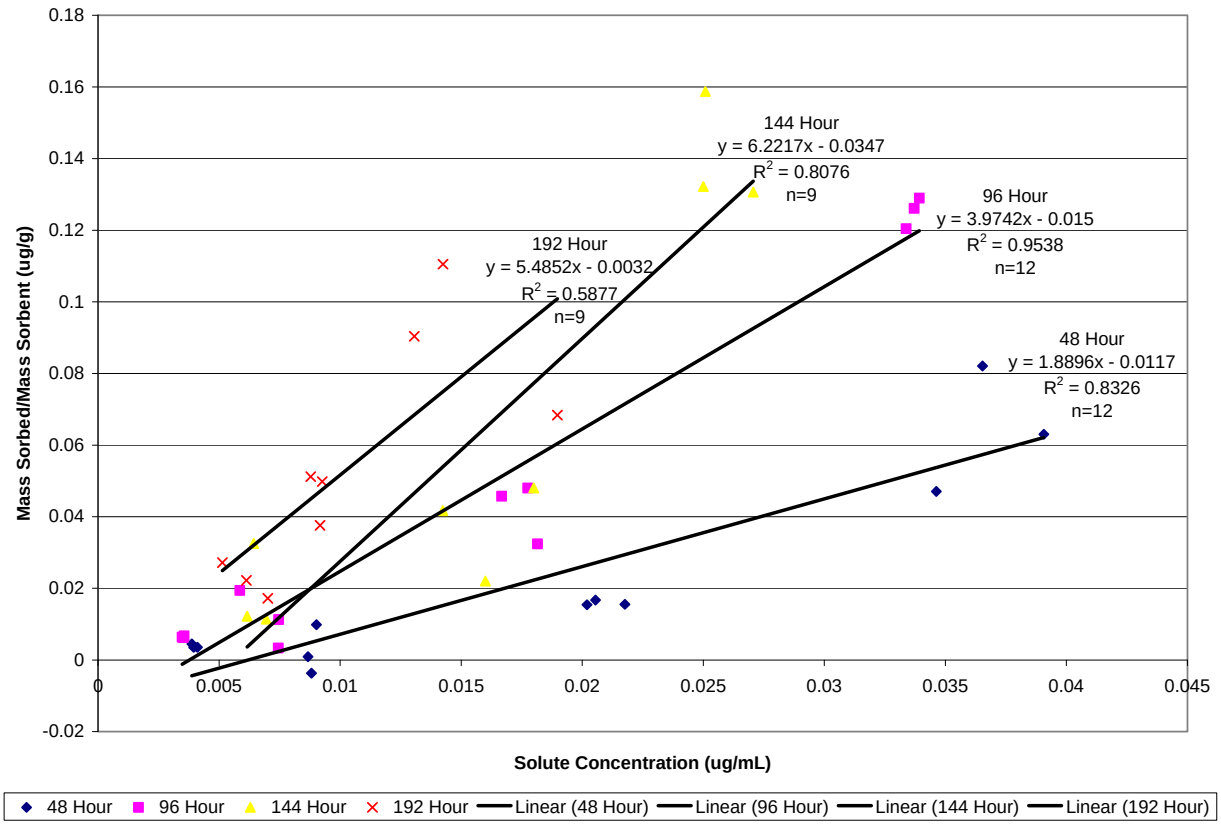


Figure 6: Antimony Sorption (K_d) at RS-21 for Challenge Solution Samples AA-DD

Copper Sorption

For copper, the sorption values reported in Table 2 are based on all available concentration range data for the 144-hour batch tests (See Figures 7 and 8).

The initial copper concentrations were generally lower than the target concentrations due to precipitation of the metal when the challenge solutions were prepared using site groundwater. However, detectable concentrations were still reportable in the initial solution (before the batch tests began) and at the conclusion of most of the tests. The lower initial concentrations resulted in inconsistent results at the lower concentrations, which limit the potential to evaluate sorption at the lower concentrations independent of the higher concentrations. In addition, the average R_d values for each challenge solution were co-correlated with the specified initial challenge solution concentration of copper. Pending validation of the analytical work for these tests, reevaluation of the associated quality assurance data, and possible additional statistical analysis, this data should be considered preliminary.

The soil sample from GW-009 (See Figure 7) sorbed copper with a K_d values ranging from 142 to 304 L/Kg based on the results from the 48-hour through the 192 test data (that is, based on the slope of the best fit line through data collected for each time step). The soil sample from RS-21 (See Figure 8) sorbed copper with a K_d values ranging from 160 to 343 L/Kg based on the results from the 48-hour and the 144-hour test data (that is, based on the slope of the best fit line through data collected for each time step). The test data from the 96-hour and 192-hour tests for soil sample RS-21 were not adequate to develop an accurate slope to represent K_d.

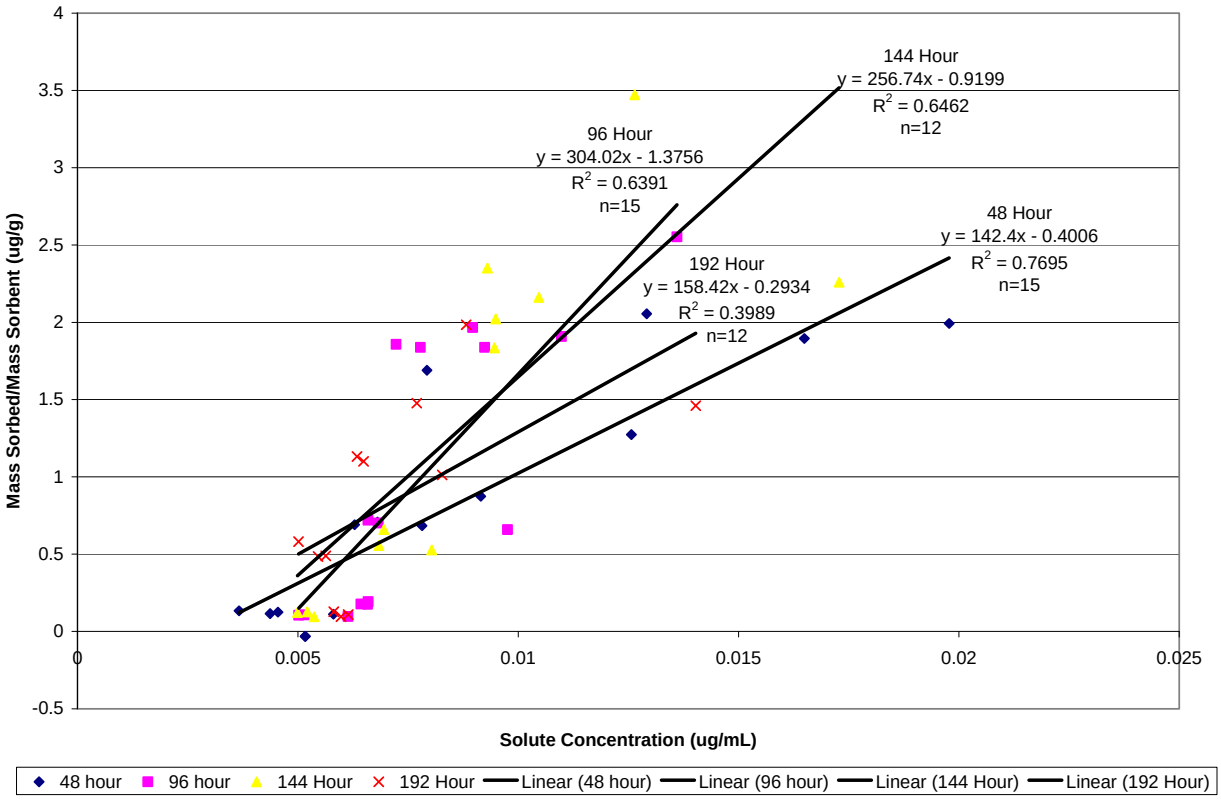


Figure 7: Copper Sorption (K_d) at GW-009

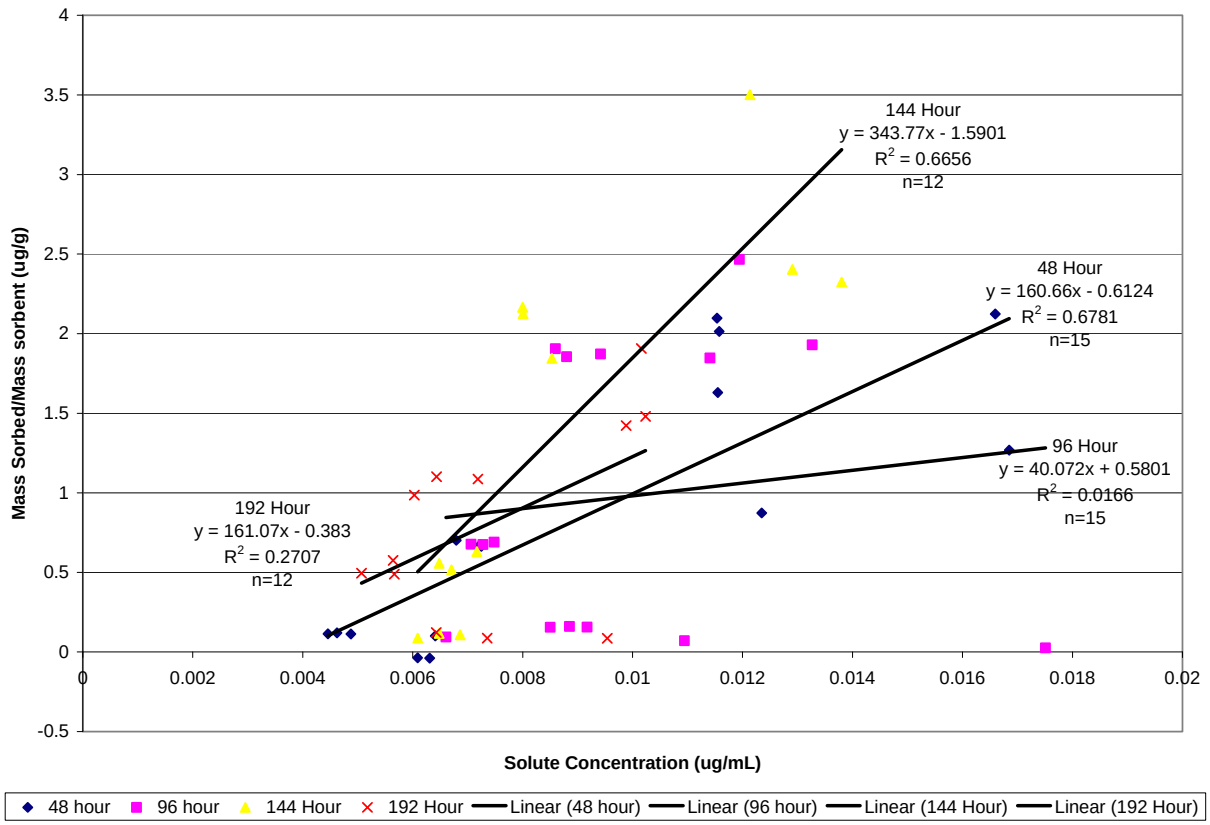


Figure 8: Copper Sorption (K_d) at RS-21

Nickel Sorption

For nickel, the plot of the sorption results over the entire range of the concentrations in the five challenge solutions shows that the capacity of the soil for nickel sorption is also continuing to increase throughout the duration of the sorption test (See Figures 9 and 10). The slopes of the lines computed using the data from the 192-hour sample sets are used for the sorption values included in Table 2. No apparent decrease in sorption at higher initial solute concentrations is observed, suggesting that the sorptive capacity of the soils for nickel is likely in the range where the linear relationship between sorbed and solute concentrations was maintained. However, a more rigorous analysis has not been conducted because the initial K_d estimates are above the U.S. EPA recommended screening values.

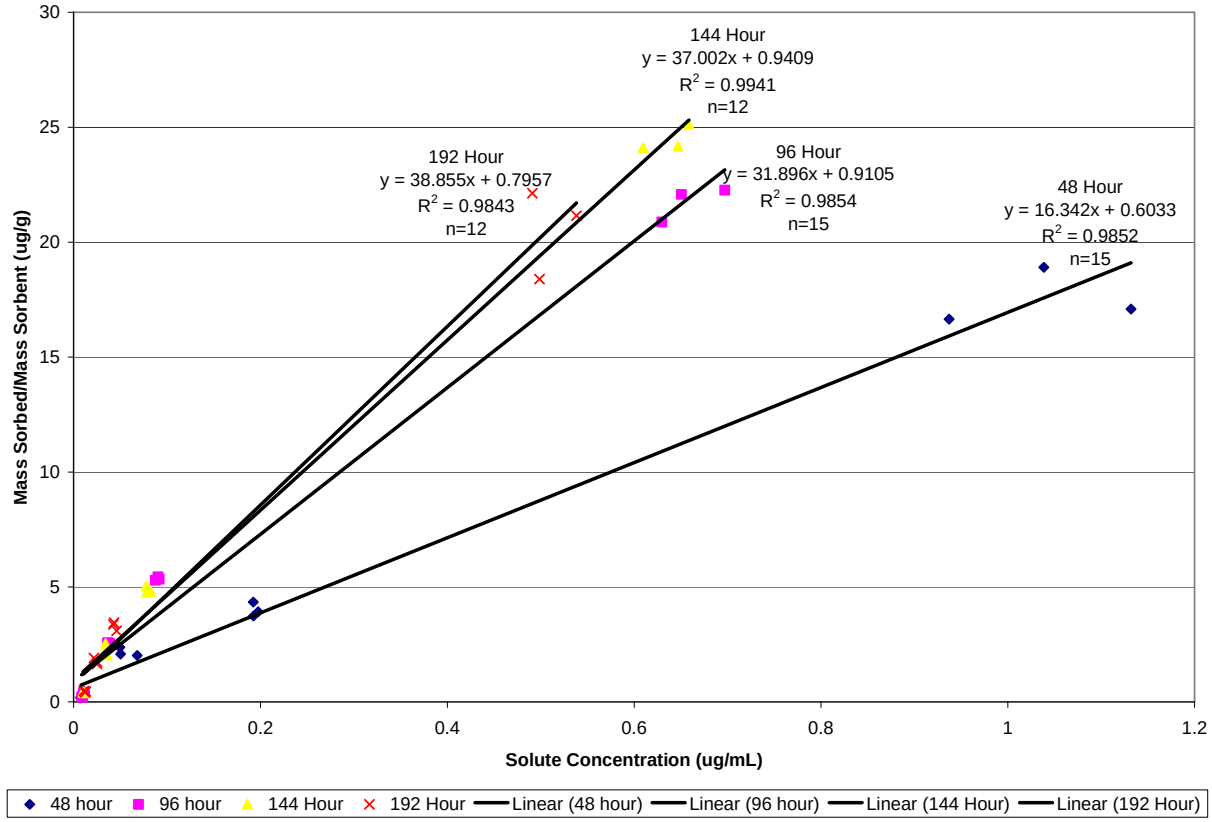


Figure 9: Nickel Sorption (K_d) at GW-009

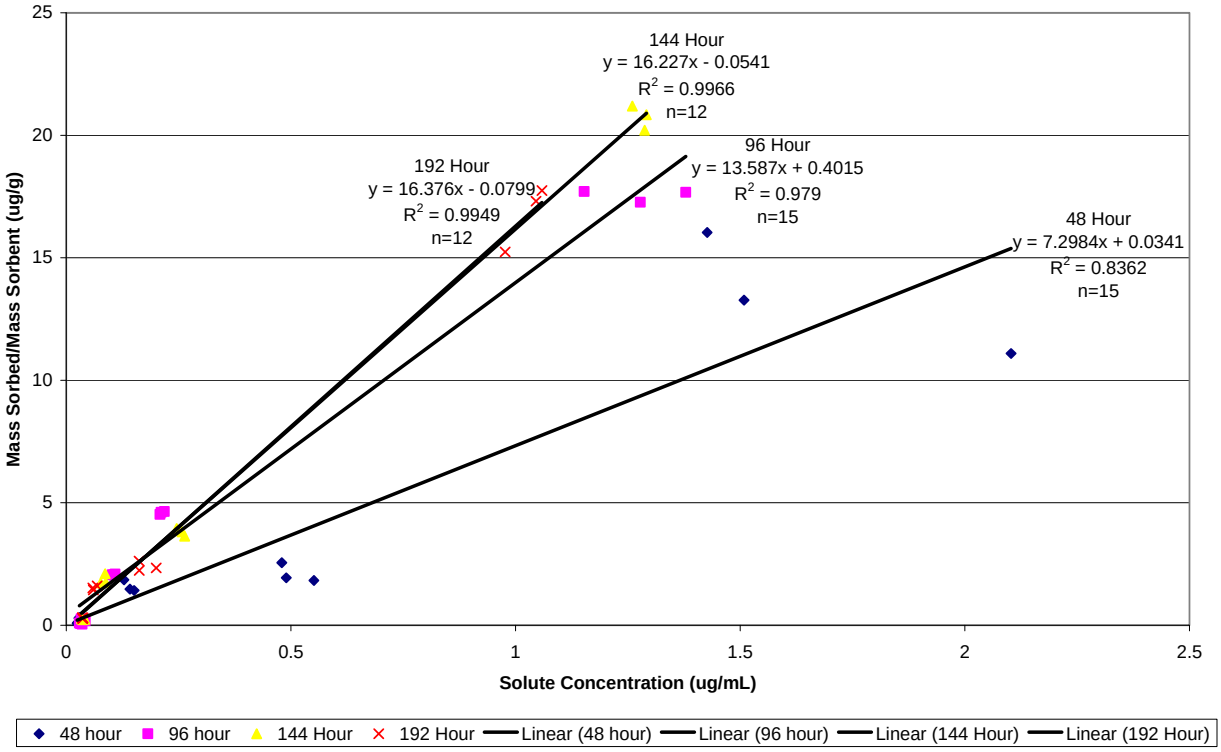


Figure 10: Nickel Sorption (K_d) at RS-21

Discussion

The results reported in Table 2 show that the screening-level sorption values recommended by the U.S. EPA are generally conservative for the aquifer material north of the Tailings Basin. With the exception of antimony, the average of the sorption values for the two soils used in this study from north of the tailings basin are greater than the U.S. EPA screening values. The updated groundwater flow and transport model will use the average site specific K_d values presented in Table 2.

References

U.S. EPA, 1996. Soil Screening Guidance: User's Guide, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington D.C., EPA/540/R-96/018.

U.S. EPA, 2005. Partition Coefficients for Metals in Surface Water, Soil, and Waste. U.S. EPA, Office of Research and Development, Washington, D.C., EPA/600/R-05/074, July 2005.

Barr Footer: Date: 6/4/2009 8:58:39 AM File: I:\Client\Polymet\Users\ree\Site boring location map.mxd User: REE

Mesaba Road

Transmission Line & Snowmobile Trail

RS-21

GW009

PolyMet

Tailings Basin

T60 R14 Section 33 | T60 R14 Section 34 | T60 R14 Section 35 | T60 R14 Section 36 | T60 R13 Section 31 | T60 R13 Section 32 | T60 R13 Section 33 | T60 R13 Section 34 | T60 R13 Section 35

T60 R13 Section 21 | T60 R13 Section 22 | T60 R13 Section 23

T60 R13 Section 28 | T60 R13 Section 27 | T60 R13 Section 26

SW-001

T59 R14 Section 5 | T59 R14 Section 4 | T59 R14 Section 3 | T59 R14 Section 2 | T59 R14 Section 1 | T59 R13 Section 6 | T59 R13 Section 5 | T59 R13 Section 4 | T59 R13 Section 3 | T59 R13 Section 2

20%

60%

T59 R14 Section 8 | T59 R14 Section 9 | T59 R14 Section 10 | T59 R14 Section 11 | T59 R14 Section 12 | T59 R13 Section 7 | T59 R13 Section 8 | T59 R13 Section 9 | T59 R13 Section 10 | T59 R13 Section 11

RS-22 RS-22

PolyMet

20%

RS-23 RS-23

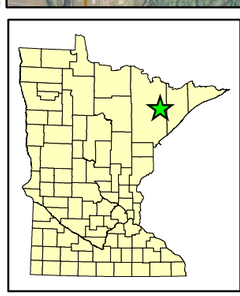
Dunka Road

RS-24 RS-24

100%

100%

T59 R14 Section 17 | T59 R14 Section 16 | T59 R14 Section 15 | T59 R14 Section 14 | T59 R14 Section 13 | T59 R13 Section 18 | T59 R13 Section 17 | T59 R13 Section 16 | T59 R13 Section 15 | T59 R13 Section 14



Boring Locations

County Roads

Powerline Corridor

N

Feet

3,000 0 3,000 6,000

BARR

Figure 1

SOIL ADSORPTION BORINGS
PolyMet Mining
Hoyt Lakes, MN

Attachment 1

Boring Logs (GW-009 & RS-21)

LOG OF WELL GW-009

Client PolyMet Mining Corporation
Project Name Soil Adsorption Testing
Number 23/69-0862
Location North of Tailings Basin

Drill Contractor Boart Longyear
Drill Method Rotosonic
Drilling Started 2/24/09 Ended 2/24/09
Logged By REE

Elevation --
Total Depth 15

DEPTH FEET	SAMP. LENGTH & RECOVERY	Matrix Effervescence	Soil pH-ORP-Specific Cond.	%GR/SA/FINES	Moisture	Matrix Color	ASTM	LITHOLOGY	Stratigraphic Unit	DESCRIPTION	WELL OR PIEZOMETER CONSTRUCTION DETAIL	DEPTH FEET
					Frozen	10YR 2/2 Very Dark Brown	OL		Organic Soil	Sandy organic soil, roots present.		
				0/60/40	Moist-Wet	10YR 5/2 Grayish Brown				Silty sand with some rootlets, slightly gleyed.	0-1.5': Cement Grout	
2	63%				Moist					Silty sand, medium to coarse-grained, silty lenses present up to 3" thick, some of the lenses gleyed (10YR 4/1 - dark gray).	1.5-2': Bentonite Chips	2
				5/75/20		10YR 4/6 Dark Yellow Brown			Upper Till		2-15': Sand	
4					Wet		SM					4
6	100%									Silty sand with gravel and cobbles, medium to coarse-grained, cobbles up to 6" diameter.		6
8				20/50/30	Wet-Moist	10YR 5/1 Gray			Lower Till		3.5-13.5': Screen	8

(continued)

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Remarks: Soil Adsorption Sample: GW-009 4'-6'; Water Sample: GW-009 water.

Additional data may have been collected in the field which is not included on this log.

LOG OF WELL GW-009

Client PolyMet Mining Corporation
Project Name Soil Adsorption Testing
Number 23/69-0862
Location North of Tailings Basin

Drill Contractor Boart Longyear
Drill Method Rotosonic
Drilling Started 2/24/09 Ended 2/24/09
Logged By REE

Elevation --
Total Depth 15

DEPTH FEET	SAMP. LENGTH & RECOVERY	Matrix Effervescence	Soil pH-ORP-Specific Cond.	%GR/SA/FINES	Moisture	Matrix Color	ASTM	LITHOLOGY	Stratigraphic Unit	DESCRIPTION	WELL OR PIEZOMETER CONSTRUCTION DETAIL	DEPTH FEET
12	100%			25/60/15	Wet	10YR 4/1 Gray	SM		Lower Till	Silty sand with gravel, medium to coarse-grained.		12
14	80%								Bed-rock	Granitic bedrock.		14
										Bedrock at 12.5 feet End of Boring - 15 feet		
16												16
18												18

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Remarks: Soil Adsorption Sample: GW-009 4'-6'; Water Sample: GW-009 water.

Additional data may have been collected in the field which is not included on this log.

LOG OF Boring RS-21

Client PolyMet Mining Corporation
Project Name Soil Adsorption Testing
Number 23/69-0862
Location North of Tailings Basin

Drill Contractor Boart Longyear
Drill Method Rotosonic
Drilling Started 2/24/09 Ended 2/24/09
Logged By REE

Elevation --
Total Depth 40

DEPTH FEET	SAMP. LENGTH & RECOVERY	Matrix Effervescence	Soil pH-ORP-Specific Cond.	%GR/SA/FINES	Moisture	Matrix Color	ASTM	LITHOLOGY	Stratigraphic Unit	DESCRIPTION	DEPTH FEET
0	100%				Frozen					Organic peat, composed of woody material and roots, some cattails at surface.	0
2					Moist						2
4						2.5YR 2.5/3 Dark Red Brown					4
6	87%				Wet						6
8				0/90/10		10YR 5/1 Gray	SP-SM		Lower Till	Sand with silt, fine to medium-grained.	8
										(continued)	

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Remarks: Soil Adsorption Sample: RS-21 10'-15'

Additional data may have been collected in the field which is not included on this log.

LOG OF Boring RS-21

Client PolyMet Mining Corporation
Project Name Soil Adsorption Testing
Number 23/69-0862
Location North of Tailings Basin

Drill Contractor Boart Longyear
Drill Method Rotosonic
Drilling Started 2/24/09 Ended 2/24/09
Logged By REE

Elevation --
Total Depth 40

DEPTH FEET	SAMP. LENGTH & RECOVERY	Matrix Effervescence	Soil pH-ORP-Specific Cond.	%GR/SA/FINES	Moisture	Matrix Color	ASTM	LITHOLOGY	Stratigraphic Unit	DESCRIPTION	DEPTH FEET
12										Sand with silt, fine to medium-grained.*(continued)*	12
14				0/90/10		10YR 5/1 Gray	SP-SM				14
	87%				Wet				Lower Till		
16											16
										Silt with sand, very fine-grained sand.	
18				0/40/60		10YR 5/1 Gray	ML				18
										(continued)	

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Remarks: Soil Adsorption Sample: RS-21 10'-15'

Additional data may have been collected in the field which is not included on this log.

LOG OF Boring RS-21

Client PolyMet Mining Corporation
Drill Contractor Boart Longyear
Project Name Soil Adsorption Testing
Drill Method Rotosonic
Number 23/69-0862
Drilling Started 2/24/09 Ended 2/24/09
Elevation --
Location North of Tailings Basin
Logged By REE
Total Depth 40

DEPTH FEET	SAMP. LENGTH & RECOVERY	Matrix Effervescence	Soil pH-ORP-Specific Cond.	%GR/SA/FINES	Moisture	Matrix Color	ASTM	LITHOLOGY	Stratigraphic Unit	DESCRIPTION	DEPTH FEET
22										Silt with sand, fine to coarse-grained. Poor recovery from 20 to 38'.	22
24						10YR 4/1 Gray	ML				24
26											26
28											28

(continued)

Barr Engineering Co.
4700 W. 77th St. Suite 200
Edina, MN 55435
Telephone: 952-832-2600
Fax: 952-832-2601

Remarks: Soil Adsorption Sample: RS-21 10'-15'

Additional data may have been collected in the field which is not included on this log.

LOG OF Boring RS-21

Client PolyMet Mining Corporation
Project Name Soil Adsorption Testing
Number 23/69-0862
Location North of Tailings Basin

Drill Contractor Boart Longyear
Drill Method Rotosonic
Drilling Started 2/24/09 Ended 2/24/09
Logged By REE

Elevation --
Total Depth 40

DEPTH FEET	SAMP. LENGTH & RECOVERY	Matrix Effervescence	Soil pH- ORP- Specific Cond.	%GR/SA/ FINES	Moisture	Matrix Color	ASTM	LITHOLOGY	Stratigraphic Unit	DESCRIPTION	DEPTH FEET
										Silt with sand, fine to coarse-grained. Poor recovery from 20 to 38'.*(continued)*	
32											32
34	60%					10YR 4/1 Gray	ML		Lower Till		34
36											36
38									Bed-rock	Granitic bedrock.	38
										End of Boring - 40 feet	

Barr Engineering Co.
4700 W. 77th St. Suite 200
Edina, MN 55435
Telephone: 952-832-2600
Fax: 952-832-2601

Remarks: Soil Adsorption Sample: RS-21 10'-15'

Additional data may have been collected in the field which is not included on this log.

Attachment 3

Tabulated Test Results (GW-009 & RS-21)

Legend Technical Services, Inc.

Soil Adsorption Spreadsheet - ASTM D4319

Sample ID: GW-009 (0901493-01)

Time of Exposure: 48 hours

Challenge Solution: AA

pH of Site Water: 7.84 (pre) / 7.71 (post)

	A				B				C				Average			
Vial Weight (g):	9.56				9.55				9.56				9.556666667			
Soil Weight (g):	7				7				7				7			
Vial+Soil+Solution Weight (g):	60.43				59.75				59.63				59.93666667			
Solution Weight (g):	43.87				43.2				43.07				43.38			
pH of Solution (final)	8.02				8.12				8.15				8.096666667			
	As	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**
Solution Results (µg/mL):	0.0059708	0.0046433	0.0235688	0.0426282	0.0057599	0.0045435		0.037056	0.0059589	0.0046836		0.0365004	0.0058965	0.0046235	0.0235688	0.0387282
Total µg added (µg):	0.261939	0.2037016	1.0339633	1.8700991	0.2488277	0.1962792	0	1.6008192	0.2566498	0.2017227	0	1.5720722	0.2558055	0.2005678	0.3446544	1.6809969
Solute analysis (µg/mL): *	0.0005	0.0020057	0.0058056	0.0077056	0.0005	0.0022587	0.0051701	0.0077611	0.0005	0.0023893	0.0051653	0.0077906	0.000500	0.002218	0.005380	0.007752
Soil concentration (µg/mL):	0.0054708	0.0026376	0.0177632	0.0349226	0.0052599	0.0022848	-0.00517	0.0292949	0.0054589	0.0022943	-0.005165	0.0287098	0.0053965	0.0024056	0.0024759	0.0309758
Total µg in soil (µg):	0.240004	0.1157115	0.7792716	1.5320545	0.2272277	0.0987034	-0.223348	1.2655397	0.2351148	0.0988155	-0.222469	1.2365311	0.2341155	0.1044101	0.1111513	1.3447084
Conc. in soil (µg/g):	0.0342863	0.0165302	0.1113245	0.2188649	0.0324611	0.0141005	-0.031907	0.1807914	0.0335878	0.0141165	-0.031781	0.1766473	0.0334451	0.0149157	0.0158788	0.1921012
Rd calculation (mL/g):	68.57257	8.2416194	19.175367	28.403359	64.922194	6.2427414	-6.171429	23.294557	67.175664	5.9082159	-6.152857	22.674415	66.890143	6.7975255	2.2836938	24.790777

Notes:

Solution weight = assume 1 g = 1 mL

** Positive arsenic levels below the reporting limit are reported as 0.0005 (half the reporting limit).*

$$\text{Rd calculation} = \frac{\text{mass of solute on the solid phase/unit mass of solid phase}}{\text{mass of solute in solution/unit volume of the liquid phase}}$$

Legend Technical Services, Inc.

Soil Adsorption Spreadsheet - ASTM D4319

Sample ID: GW-009 (0901493-01)

Time of Exposure: 48 hours

Challenge Solution: BB

pH of Site Water: 7.80 (pre) / 7.70 (post)

	A				B				C				Average			
Vial Weight (g):	9.47				9.56				9.47				9.5			
Soil Weight (g):	7				7				7				7			
Vial+Soil+Solution Weight (g):	62.29				59.91				61.99				61.39666667			
Solution Weight (g):	45.82				43.35				45.52				44.89666667			
pH of Solution (final)	8.4				8.19				8.14				8.243333333			
	As	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**
Solution Results (µg/mL):	0.007282	0.010656	0.023702	0.082723	0.005494	0.008818	0.02296	0.076136	0.005872	0.008218	0.024208	0.078828	0.006216	0.0092307	0.0236233	0.079229
Total µg added (µg):	0.3336612	0.4882579	1.0860256	3.7903679	0.2381649	0.3822603	0.995316	3.3004956	0.2672934	0.3740834	1.1019482	3.5882506	0.2797065	0.4148672	1.0610966	3.5597047
Solute analysis (µg/mL): *	0.00016	0.006162	0.004547	0.010364	0.00016	0.005623	0.00437	0.011487	0.00016	0.004105	0.003665	0.011349	0.000160	0.005297	0.004194	0.011067
Soil concentration (µg/mL):	0.007122	0.004494	0.019155	0.072359	0.005334	0.003195	0.01859	0.064649	0.005712	0.004113	0.020543	0.067479	0.006056	0.003934	0.0194293	0.0681623
Total µg in soil (µg):	0.32633	0.2059151	0.8776821	3.3154894	0.2312289	0.1385033	0.8058765	2.8025342	0.2600102	0.1872238	0.9351174	3.0716441	0.2725231	0.177214	0.872892	3.0632225
Conc. in soil (µg/g):	0.0466186	0.0294164	0.1253832	0.4736413	0.0330327	0.0197862	0.1151252	0.400362	0.0371443	0.0267463	0.1335882	0.4388063	0.0389319	0.0253163	0.1246989	0.4376032
Rd calculation (mL/g):	291.36611	4.7738462	27.574919	45.700631	206.45438	3.518794	26.344443	34.853488	232.152	6.5155302	36.449712	38.664754	243.32416	4.9360568	30.123025	39.739625

Notes:

Solution weight = assume 1 g = 1 mL

** Values below MDL or negative if arsenic = 0.00016.*

$$\text{Rd calculation} = \frac{\text{mass of solute on the solid phase/unit mass of solid phase}}{\text{mass of solute in solution/unit volume of the liquid phase}}$$

Legend Technical Services, Inc.

Soil Adsorption Spreadsheet - ASTM D4319

Sample ID: **GW-009 (0901493-01)**

Time of Exposure: **48 hours**

Challenge Solution: **CC**

pH of Site Water: **7.84 (pre) / 7.46 (post)**

	A				B				C				Average			
Vial Weight (g):	9.47				9.56				9.55				9.526666667			
Soil Weight (g):	7				7				7				7			
Vial+Soil+Solution Weight (g):	61.67				61.61				62.83				62.03666667			
Solution Weight (g):	45.2				45.05				46.28				45.51			
pH of Solution (final)	7.8				8.06				7.8				7.886666667			
	As	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**
Solution Results (µg/mL):	0.037937	0.023174	0.11321	0.37272	0.042132	0.024199	0.116726	0.41826	0.037183	0.022614	0.11126	0.37362	0.039084	0.023329	0.113732	0.3882
Total µg added (µg):	1.7147524	1.0474648	5.117092	16.846944	1.8980466	1.090165	5.2585063	18.842613	1.7208292	1.0465759	5.1491128	17.291134	1.7778761	1.0614019	5.1749037	17.66023
Solute analysis (µg/mL): *	0.00016	0.014007	0.006289	0.050236	0.000356	0.013474	0.006806	0.049475	0.00198	0.013474	0.007818	0.067998	0.000832	0.013652	0.006971	0.055903
Soil concentration (µg/mL):	0.037777	0.009167	0.106921	0.322484	0.041776	0.010725	0.10992	0.368785	0.035203	0.00914	0.103442	0.305622	0.038252	0.0096773	0.106761	0.332297
Total µg in soil (µg):	1.7075204	0.4143484	4.8328292	14.576277	1.8820088	0.4831613	4.951896	16.613764	1.6291948	0.4229992	4.7872958	14.144186	1.7395747	0.4401696	4.8573403	15.111409
Conc. in soil (µg/g):	0.2439315	0.0591926	0.6904042	2.0823253	0.2688584	0.069023	0.7074137	2.3733949	0.2327421	0.0604285	0.6838994	2.020598	0.2485107	0.0628814	0.6939058	2.1587727
Rd calculation (mL/g):	1524.5718	4.2259319	109.77964	41.450857	755.22022	5.1226834	103.93972	47.9716	117.54653	4.4848194	87.477538	29.715551	799.11285	4.6111449	100.39897	39.712669

Notes:

Solution weight = assume 1 g = 1 mL

** Values below MDL or negative if arsenic = 0.00016.*

$$\text{Rd calculation} = \frac{\text{mass of solute on the solid phase/unit mass of solid phase}}{\text{mass of solute in solution/unit volume of the liquid phase}}$$

Legend Technical Services, Inc.

Soil Adsorption Spreadsheet - ASTM D4319

Sample ID: GW-009 (0901493-01)

Time of Exposure: 48 hours

Challenge Solution: DD

pH of Site Water: 7.81 (pre) / 7.20 (post)

	A				B				C				Average			
Vial Weight (g):	9.46				9.55				9.47				9.493333333			
Soil Weight (g):	7.01				7				7.01				7.006666667			
Vial+Soil+Solution Weight (g):	59.84				60.94				61.06				60.61333333			
Solution Weight (g):	43.37				44.39				44.58				44.11333333			
pH of Solution (final)	8.04				7.87				7.78				7.896666667			
	As	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**
Solution Results (µg/mL):	0.079973	0.048712	0.34133	0.83082	0.076916	0.04173	0.3154	0.78149	0.087036	0.04922	0.33561	0.8741	0.0813083	0.046554	0.33078	0.8288033
Total µg added (µg):	3.468429	2.1126394	14.803482	36.032663	3.4143012	1.8523947	14.000606	34.690341	3.8800649	2.1942276	14.961494	38.967378	3.5875984	2.0530872	14.588527	36.563461
Solute analysis (µg/mL):	0.004701	0.02662	0.019778	0.19755	0.004246	0.026379	0.016494	0.19244	0.005488	0.0294	0.012915	0.19228	0.004812	0.027466	0.016396	0.194090
Soil concentration (µg/mL):	0.075272	0.022092	0.321552	0.63327	0.07267	0.015351	0.298906	0.58905	0.081548	0.01982	0.322695	0.68182	0.0764967	0.0190877	0.3143843	0.6347133
Total µg in soil (µg):	3.2645466	0.95813	13.94571	27.46492	3.2258213	0.6814309	13.268437	26.14793	3.6354098	0.8835756	14.385743	30.395536	3.3752593	0.8410455	13.86663	28.002795
Conc. in soil (µg/g):	0.4656985	0.1366805	1.9894023	3.9179629	0.4608316	0.0973473	1.895491	3.7354185	0.5186034	0.126045	2.0521745	4.336025	0.4817112	0.1200243	1.9790226	3.9964688
Rd calculation (mL/g):	99.063715	5.1345027	100.58663	19.832766	108.53312	3.6903321	114.92003	19.410822	94.497704	4.2872456	158.89853	22.550578	100.69818	4.3706935	124.80173	20.598055

Notes:

Solution weight = assume 1 g = 1 mL

$$\text{Rd calculation} = \frac{\text{mass of solute on the solid phase/unit mass of solid phase}}{\text{mass of solute in solution/unit volume of the liquid phase}}$$

Legend Technical Services, Inc.

Soil Adsorption Spreadsheet - ASTM D4319

Sample ID: GW-009 (0901493-01)

Time of Exposure: 48 hours

Challenge Solution: EE

pH of Site Water: 7.82 (pre) / 6.89 (post)

	A				B				C				Average			
Vial Weight (g):	9.55				9.47				9.47				9.496666667			
Soil Weight (g):	7				7				7				7			
Vial+Soil+Solution Weight (g):	61.61				61.09				61.93				61.54333333			
Solution Weight (g):	45.06				44.62				45.46				45.04666667			
pH of Solution (final)	7.23				7.15				7.27				7.216666667			
	As	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**
Solution Results (µg/mL):	0.15404	0.095099	0.14498	3.524	0.19105	0.099955	0.21244	3.8135	0.22717	0.10459	0.26811	3.9498	0.1907533	0.0998813	0.20851	3.7624333
Total µg added (µg):	6.9410424	4.2851609	6.5327988	158.79144	8.524651	4.4599921	9.4790728	170.15837	10.327148	4.7546614	12.188281	179.55791	8.5976139	4.4999381	9.4000507	169.50257
Solute analysis (µg/mL):	0.004082	0.059648	0.00915	0.93725	0.009779	0.057355	0.012566	1.132	0.007937	0.059008	0.007929	1.0386	0.007266	0.058670	0.009882	1.035950
Soil concentration (µg/mL):	0.149958	0.035451	0.13583	2.58675	0.181271	0.0426	0.199874	2.6815	0.219233	0.045582	0.260181	2.9112	0.1834873	0.041211	0.1986283	2.7264833
Total µg in soil (µg):	6.7571075	1.5974221	6.1204998	116.55896	8.088312	1.900812	8.9183779	119.64853	9.9663322	2.0721577	11.827828	132.34315	8.2705839	1.8567973	8.9555686	122.85021
Conc. in soil (µg/g):	0.9653011	0.2282032	0.8743571	16.651279	1.1554731	0.2715446	1.274054	17.092647	1.4237617	0.2960225	1.6896898	18.906165	1.181512	0.2652568	1.2793669	17.55003
Rd calculation (mL/g):	236.47748	3.8258307	95.558155	17.766102	118.15862	4.7344533	101.38898	15.099512	179.38286	5.0166508	213.1025	18.203509	178.00632	4.525645	136.68321	17.023041

Notes:

Solution weight = assume 1 g = 1 mL

$$\textit{Rd calculation} = \frac{\textit{mass of solute on the solid phase/unit mass of solid phase}}{\textit{mass of solute in solution/unit volume of the liquid phase}}$$

Legend Technical Services, Inc.

Soil Adsorption Spreadsheet - ASTM D4319

Sample ID: GW-009 (0901493-01)

Time of Exposure: 96 hours

Challenge Solution: AA

pH of Site Water: 7.84 (pre) / 7.71 (post)

	A				B				C				Average			
Vial Weight (g):	9.56				9.56				9.56				9.56			
Soil Weight (g):	7				7				7				7			
Vial+Soil+Solution Weight (g):	62.09				60.09				60.68				60.95333333			
Solution Weight (g):	45.53				43.53				44.12				44.39333333			
pH of Solution (final)	7.13				7.16				7.17				7.153333333			
	As	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**
Solution Results (µg/mL):	0.0071614	0.0045882	0.0362852	0.0447422	0.0064967	0.0045273	0.0350434	0.0425692	0.0067853	0.0046815	0.0344637	0.0429781	0.0068145	0.004599	0.0352641	0.0434298
Total µg added (µg):	0.3260585	0.2089007	1.6520652	2.0371124	0.2828014	0.1970734	1.5254392	1.8530373	0.2993674	0.2065478	1.5205384	1.8961938	0.3027424	0.204174	1.5660143	1.9287811
Solute analysis (µg/mL): *	0.0005	0.0016001	0.0065955	0.0097005	0.0005	0.001653	0.0064337	0.0085532	0.0005	0.0014701	0.0065791	0.0093753	0.000500	0.001574	0.006536	0.009210
Soil concentration (µg/mL):	0.0066614	0.0029881	0.0296897	0.0350417	0.0059967	0.0028743	0.0286097	0.034016	0.0062853	0.0032114	0.0278846	0.0336028	0.0063145	0.0030246	0.028728	0.0342202
Total µg in soil (µg):	0.3032935	0.1360482	1.351772	1.5954486	0.2610364	0.1251183	1.2453802	1.4807165	0.2773074	0.141687	1.2302686	1.4825555	0.2805458	0.1342845	1.2758069	1.5195735
Conc. in soil (µg/g):	0.0433276	0.0194355	0.1931103	0.2279212	0.0372909	0.017874	0.1779115	0.2115309	0.0396153	0.020241	0.1757527	0.2117936	0.040078	0.0191835	0.1822581	0.2170819
Rd calculation (mL/g):	86.655298	12.146401	29.279098	23.495823	74.581815	10.813091	27.653055	24.731203	79.230696	13.768448	26.713783	22.5906	80.155936	12.242647	27.881979	23.605875

Notes:

Solution weight = assume 1 g = 1 mL

** Positive arsenic levels below the reporting limit are reported as 0.0005 (half the reporting limit).*

$$\text{Rd calculation} = \frac{\text{mass of solute on the solid phase/unit mass of solid phase}}{\text{mass of solute in solution/unit volume of the liquid phase}}$$

Legend Technical Services, Inc.

Soil Adsorption Spreadsheet - ASTM D4319

Sample ID: **GW-009 (0901493-01)**

Time of Exposure: **96 hours**

Challenge Solution: **BB**

pH of Site Water: **7.80 (pre) / 7.70 (post)**

	A				B				C				Average			
Vial Weight (g):	9.47				9.47				9.48				9.473333333			
Soil Weight (g):	7				7				7				7			
Vial+Soil+Solution Weight (g):	60.28				60.97				60.28				60.51			
Solution Weight (g):	43.81				44.5				43.8				44.03666667			
pH of Solution (final)	7.1				7.3				7.19				7.196666667			
	As	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**
Solution Results (µg/mL):	0.005036	0.008974	0.022342	0.07684	0.00543	0.009245	0.021574	0.073427	0.005984	0.007968	0.021566	0.071125	0.0054833	0.008729	0.0218273	0.0737973
Total µg added (µg):	0.2206272	0.3931509	0.978803	3.3663604	0.241635	0.4114025	0.960043	3.2675015	0.2620992	0.3489984	0.9445908	3.115275	0.2414538	0.3845173	0.9611456	3.2497123
Solute analysis (µg/mL): *	0.00016	0.003246	0.005142	0.011034	0.00016	0.003753	0.005021	0.011034	0.00016	0.004964	0.006136	0.010328	0.000160	0.003988	0.005433	0.010799
Soil concentration (µg/mL):	0.004876	0.005728	0.0172	0.065806	0.00527	0.005492	0.016553	0.062393	0.005824	0.003004	0.01543	0.060797	0.0053233	0.0047413	0.0163943	0.0629987
Total µg in soil (µg):	0.2136176	0.2509437	0.753532	2.8829609	0.234515	0.244394	0.7366085	2.7764885	0.2550912	0.1315752	0.675834	2.6629086	0.2344079	0.208971	0.7219915	2.7741193
Conc. in soil (µg/g):	0.0305168	0.0358491	0.1076474	0.4118516	0.0335021	0.0349134	0.1052298	0.3966412	0.0364416	0.0187965	0.0965477	0.3804155	0.0334868	0.029853	0.1031416	0.3963028
Rd calculation (mL/g):	190.72996	11.044084	20.934934	37.32568	209.38839	9.3028054	20.957934	35.947183	227.76	3.7865546	15.734634	36.833415	209.29279	8.0444814	19.209167	36.702093

Notes:

Solution weight = assume 1 g = 1 mL

** Values below MDL or negative if arsenic = 0.00016.*

$$\text{Rd calculation} = \frac{\text{mass of solute on the solid phase/unit mass of solid phase}}{\text{mass of solute in solution/unit volume of the liquid phase}}$$

Legend Technical Services, Inc.

Soil Adsorption Spreadsheet - ASTM D4319

Sample ID: GW-009 (0901493-01)

Time of Exposure: 96 hours

Challenge Solution: CC

pH of Site Water: 7.84 (pre) / 7.46 (post)

	A				B				C				Average			
Vial Weight (g):	9.55				9.47				9.55				9.523333333			
Soil Weight (g):	7				7				7				7			
Vial+Soil+Solution Weight (g):	61.99				62.25				62.55				62.26333333			
Solution Weight (g):	45.44				45.78				46				45.74			
pH of Solution (final)	7.42				7.52				7.47				7.47			
	As	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**
Solution Results (µg/mL):	0.040603	0.023728	0.11129	0.43024	0.039365	0.023289	0.11678	0.42842	0.04177	0.025315	0.11359	0.42792	0.0405793	0.0241107	0.1138867	0.42886
Total µg added (µg):	1.8450003	1.0782003	5.0570176	19.550106	1.8021297	1.0661704	5.3461884	19.613068	1.92142	1.16449	5.22514	19.68432	1.8561833	1.1029536	5.2094487	19.615831
Solute analysis (µg/mL): *	0.00016	0.010031	0.009758	0.038582	0.00016	0.008555	0.006592	0.036914	0.00016	0.008039	0.006824	0.036355	0.000160	0.008875	0.007725	0.037284
Soil concentration (µg/mL):	0.040443	0.013697	0.101532	0.391658	0.039205	0.014734	0.110188	0.391506	0.04161	0.017276	0.106766	0.391565	0.0404193	0.0152357	0.106162	0.3915763
Total µg in soil (µg):	1.8377299	0.6223917	4.6136141	17.79694	1.7948049	0.6745225	5.0444066	17.923145	1.91406	0.794696	4.911236	18.01199	1.8488649	0.6972034	4.8564189	17.910691
Conc. in soil (µg/g):	0.2625328	0.0889131	0.6590877	2.5424199	0.2564007	0.0963604	0.7206295	2.5604492	0.2734371	0.113528	0.7016051	2.5731414	0.2641236	0.0996005	0.6937741	2.5586702
Rd calculation (mL/g):	1640.8303	8.8638318	67.543321	65.89653	1602.5044	11.263631	109.3188	69.362552	1708.9821	14.122154	102.81435	70.778199	1650.7723	11.416539	93.225491	68.679094

Notes:

Solution weight = assume 1 g = 1 mL

** Values below MDL or negative if arsenic = 0.00016.*

$$\text{Rd calculation} = \frac{\text{mass of solute on the solid phase/unit mass of solid phase}}{\text{mass of solute in solution/unit volume of the liquid phase}}$$

Legend Technical Services, Inc.

Soil Adsorption Spreadsheet - ASTM D4319

Sample ID: GW-009 (0901493-01)

Time of Exposure: 96 hours

Challenge Solution: DD

pH of Site Water: 7.81 (pre) / 7.20 (post)

	A				B				C				Average			
Vial Weight (g):	9.55				9.47				9.55				9.523333333			
Soil Weight (g):	7				7				7				7			
Vial+Soil+Solution Weight (g):	62.05				61.22				61.95				61.74			
Solution Weight (g):	45.5				44.75				45.4				45.21666667			
pH of Solution (final)	7.39				7.4				7.42				7.403333333			
	As	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**
Solution Results (µg/mL):	0.094833	0.053955	0.30458	0.92693	0.097129	0.052957	0.29521	0.92691	0.093616	0.051871	0.29364	0.90363	0.0951927	0.0529277	0.29781	0.9191567
Total µg added (µg):	4.3149015	2.4549525	13.85839	42.175315	4.3465228	2.3698258	13.210648	41.479223	4.2501664	2.3549434	13.331256	41.024802	4.3038636	2.3932406	13.466765	41.55978
Solute analysis (µg/mL): *	0.00016	0.01957	0.010981	0.090363	0.00016	0.020106	0.00778	0.09158	0.00016	0.020399	0.007228	0.087383	0.000160	0.020025	0.008663	0.089775
Soil concentration (µg/mL):	0.094673	0.034385	0.293599	0.836567	0.096969	0.032851	0.28743	0.83533	0.093456	0.031472	0.286412	0.816247	0.0950327	0.0329027	0.289147	0.8293813
Total µg in soil (µg):	4.3076215	1.5645175	13.358755	38.063799	4.3393628	1.4700823	12.862493	37.381018	4.2429024	1.4288288	13.003105	37.057614	4.2966289	1.4878095	13.074784	37.50081
Conc. in soil (µg/g):	0.6153745	0.2235025	1.9083935	5.4376855	0.619909	0.2100118	1.8374989	5.3401454	0.6061289	0.2041184	1.8575864	5.2939448	0.6138041	0.2125442	1.8678263	5.3572586
Rd calculation (mL/g):	3846.0906	11.420669	173.7905	60.176018	3874.431	10.445228	236.18238	58.311262	3788.3057	10.006294	256.99867	60.583235	3836.2758	10.624064	222.32385	59.690172

Notes:

Solution weight = assume 1 g = 1 mL

** Values below MDL or negative if arsenic = 0.00016.*

$$\text{Rd calculation} = \frac{\text{mass of solute on the solid phase/unit mass of solid phase}}{\text{mass of solute in solution/unit volume of the liquid phase}}$$

Legend Technical Services, Inc.

Soil Adsorption Spreadsheet - ASTM D4319

Sample ID: GW-009 (0901493-01)

Time of Exposure: 96 hours

Challenge Solution: EE

pH of Site Water: 7.82 (pre) / 6.89 (post)

	A				B				C				Average			
Vial Weight (g):	9.55				9.55				9.55				9.55			
Soil Weight (g):	7				7				7				7			
Vial+Soil+Solution Weight (g):	62.62				62.87				62.05				62.51333333			
Solution Weight (g):	46.07				46.32				45.5				45.96333333			
pH of Solution (final)	7.18				7.17				7.18				7.176666667			
	As	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**
Solution Results (µg/mL):	0.26064	0.10741	0.40156	4.0052	0.23357	0.10515	0.30612	4.0609	0.22708	0.10244	0.29199	3.8411	0.24043	0.105	0.3332233	3.9690667
Total µg added (µg):	12.007685	4.9483787	18.499869	184.51956	10.818962	4.870548	14.179478	188.10089	10.33214	4.66102	13.285545	174.77005	11.052929	4.8266489	15.321631	182.4635
Solute analysis (µg/mL):	0.005032	0.039387	0.013602	0.65058	0.009652	0.043056	0.008967	0.69707	0.005815	0.042449	0.009237	0.62972	0.006833	0.041631	0.010602	0.659123
Soil concentration (µg/mL):	0.255608	0.068023	0.387958	3.35462	0.223918	0.062094	0.297153	3.36383	0.221265	0.059991	0.282753	3.21138	0.233597	0.0633693	0.3226213	3.3099433
Total µg in soil (µg):	11.775861	3.1338196	17.873225	154.54734	10.371882	2.8761941	13.764127	155.81261	10.067558	2.7295905	12.865262	146.11779	10.738433	2.9132014	14.834205	152.15925
Conc. in soil (µg/g):	1.6822658	0.4476885	2.5533179	22.078192	1.4816974	0.4108849	1.9663039	22.258944	1.4382225	0.3899415	1.8378945	20.87397	1.5340619	0.4161716	2.1191721	21.737035
Rd calculation (mL/g):	334.31355	11.366403	187.71636	33.936168	153.51196	9.5430339	219.28224	31.93215	247.32975	9.1861175	198.97093	33.148018	245.05175	10.031851	201.98984	33.005445

Notes:

Solution weight = assume 1 g = 1 mL

$$\text{Rd calculation} = \frac{\text{mass of solute on the solid phase/unit mass of solid phase}}{\text{mass of solute in solution/unit volume of the liquid phase}}$$

Legend Technical Services, Inc.

Soil Adsorption Spreadsheet - ASTM D4319

Sample ID: GW-009 (0901493-01)

Time of Exposure: 144 hours

Challenge Solution: BB

pH of Site Water: 7.80 (pre) / 7.70 (post)

	A				B				C				Average			
Vial Weight (g):	9.55				9.47				9.47				9.496666667			
Soil Weight (g):	7				7				7				7			
Vial+Soil+Solution Weight (g):	61.4				62.19				61.33				61.64			
Solution Weight (g):	44.85				45.72				44.86				45.14333333			
pH of Solution (final)	7.72				7.72				7.67				7.703333333			
	As	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**
Solution Results (µg/mL):	0.007047	0.008088	0.024991	0.072555	0.007394	0.008746	0.019951	0.075399	0.00797	0.011597	0.024115	0.080099	0.0074703	0.009477	0.023019	0.0760177
Total µg added (µg):	0.316058	0.3627468	1.1208464	3.2540918	0.3380537	0.3998671	0.9121597	3.4472423	0.3575342	0.5202414	1.0817989	3.5932411	0.3372153	0.4276184	1.0382683	3.4315251
Solute analysis (µg/mL): *	0.000737	0.001457	0.005215	0.010574	0.00016	0.003059	0.00537	0.010995	0.00016	0.00196	0.00499	0.010007	0.000352	0.002159	0.005192	0.010525
Soil concentration (µg/mL):	0.00631	0.006631	0.019776	0.061981	0.007234	0.005687	0.014581	0.064404	0.00781	0.009637	0.019125	0.070092	0.007118	0.0073183	0.0178273	0.0654923
Total µg in soil (µg):	0.2830035	0.2974004	0.8869536	2.7798479	0.3307385	0.2600096	0.6666433	2.9445509	0.3503566	0.4323158	0.8579475	3.1443271	0.3213662	0.3299086	0.8038481	2.956242
Conc. in soil (µg/g):	0.0404291	0.0424858	0.1267077	0.3971211	0.0472484	0.0371442	0.0952348	0.4206501	0.0500509	0.0617594	0.1225639	0.4491896	0.0459095	0.0471298	0.1148354	0.4223203
Rd calculation (mL/g):	54.856271	29.159756	24.29677	37.556376	295.30221	12.142607	17.734592	38.258311	312.81839	31.509899	24.56191	44.887538	220.99229	24.270754	22.197757	40.234075

Notes:

Solution weight = assume 1 g = 1 mL

** Values below MDL or negative if arsenic = 0.00016.*

$$\text{Rd calculation} = \frac{\text{mass of solute on the solid phase/unit mass of solid phase}}{\text{mass of solute in solution/unit volume of the liquid phase}}$$

Legend Technical Services, Inc.

Soil Adsorption Spreadsheet - ASTM D4319

Sample ID: GW-009 (0901493-01)

Time of Exposure: 144 hours

Challenge Solution: CC

pH of Site Water: 7.84 (pre) / 7.46 (post)

	A				B				C				Average			
Vial Weight (g):	9.47				9.47				9.47				9.47			
Soil Weight (g):	7				7				7				7			
Vial+Soil+Solution Weight (g):	61.79				62.51				61.42				61.90666667			
Solution Weight (g):	45.32				46.04				44.95				45.43666667			
pH of Solution (final)	7.12				7.16				7.16				7.146666667			
	As	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**
Solution Results (µg/mL):	0.055684	0.020918	0.089406	0.35238	0.041374	0.025619	0.10726	0.42031	0.034557	0.019445	0.093462	0.36027	0.0438717	0.021994	0.0967093	0.3776533
Total µg added (µg):	2.5235989	0.9480038	4.0518799	15.969862	1.904859	1.1794988	4.9382504	19.351072	1.5533372	0.8740528	4.2011169	16.194137	1.9939317	1.0005184	4.3970824	17.17169
Solute analysis (µg/mL): *	0.00016	0.009125	0.008037	0.03552	0.00016	0.009051	0.006953	0.034102	0.000737	0.008967	0.006839	0.03413	0.000352	0.009048	0.007276	0.034584
Soil concentration (µg/mL):	0.055524	0.011793	0.081369	0.31686	0.041214	0.016568	0.100307	0.386208	0.03382	0.010478	0.086623	0.32614	0.0435193	0.0129463	0.089433	0.3430693
Total µg in soil (µg):	2.5163477	0.5344588	3.6876431	14.360095	1.8974926	0.7627907	4.6181343	17.781016	1.520209	0.4709861	3.8937039	14.659993	1.9780164	0.5894119	4.0664937	15.600368
Conc. in soil (µg/g):	0.3594782	0.0763513	0.5268062	2.0514422	0.2710704	0.1089701	0.6597335	2.5401452	0.2171727	0.0672837	0.5562434	2.0942847	0.2825738	0.0842017	0.5809277	2.228624
Rd calculation (mL/g):	2246.739	8.3672604	65.547612	57.754566	1694.1898	12.039565	94.884721	74.486693	294.67125	7.5034826	81.334026	61.36199	1411.8667	9.303436	80.588787	64.534416

Notes:

Solution weight = assume 1 g = 1 mL

** Values below MDL or negative if arsenic = 0.00016.*

$$\text{Rd calculation} = \frac{\text{mass of solute on the solid phase/unit mass of solid phase}}{\text{mass of solute in solution/unit volume of the liquid phase}}$$

Legend Technical Services, Inc.

Soil Adsorption Spreadsheet - ASTM D4319

Sample ID: GW-009 (0901493-01)

Time of Exposure: 144 hours

Challenge Solution: DD

pH of Site Water: 7.81 (pre) / 7.20 (post)

	A				B				C				Average			
Vial Weight (g):	9.47				9.56				9.55				9.526666667			
Soil Weight (g):	7.09				7.09				7.08				7.086666667			
Vial+Soil+Solution Weight (g):	61.43				61.65				60.8				61.29333333			
Solution Weight (g):	44.87				45				44.17				44.68			
pH of Solution (final)	7.12				7.12				7.16				7.133333333			
	As	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**
Solution Results (µg/mL):	0.087313	0.04999	0.34771	0.86585	0.079794	0.045519	0.29491	0.82771	0.082769	0.046861	0.32988	0.83542	0.083292	0.0474567	0.3241667	0.8429933
Total µg added (µg):	3.9177343	2.2430513	15.601748	38.85069	3.59073	2.048355	13.27095	37.24695	3.6559067	2.0698504	14.5708	36.900501	3.721457	2.1204189	14.481166	37.666047
Solute analysis (µg/mL): *	0.00112	0.018176	0.010468	0.077816	0.001699	0.015595	0.009462	0.082243	0.00016	0.017343	0.009488	0.078194	0.000993	0.017038	0.009806	0.079418
Soil concentration (µg/mL):	0.086193	0.031814	0.337242	0.788034	0.078095	0.029924	0.285448	0.745467	0.082609	0.029518	0.320392	0.757226	0.082299	0.0304187	0.3143607	0.7635757
Total µg in soil (µg):	3.8674799	1.4274942	15.132049	35.359086	3.514275	1.34658	12.84516	33.546015	3.6488395	1.3038101	14.151715	33.446672	3.6768648	1.3592947	14.042974	34.117258
Conc. in soil (µg/g):	0.5454838	0.2013391	2.1342805	4.9871771	0.4956664	0.1899267	1.8117292	4.7314549	0.5153728	0.184154	1.9988298	4.7241063	0.518841	0.1918066	1.9816131	4.8142461
Rd calculation (mL/g):	487.03908	11.077195	203.88617	64.089353	291.7401	12.178689	191.47423	57.530183	3221.0801	10.618345	210.66924	60.415202	1333.2864	11.29141	202.00988	60.678246

Notes:

Solution weight = assume 1 g = 1 mL

** Values below MDL or negative if arsenic = 0.00016.*

$$\text{Rd calculation} = \frac{\text{mass of solute on the solid phase/unit mass of solid phase}}{\text{mass of solute in solution/unit volume of the liquid phase}}$$

Legend Technical Services, Inc.

Soil Adsorption Spreadsheet - ASTM D4319

Sample ID: GW-009 (0901493-01)

Time of Exposure: 144 hours

Challenge Solution: EE

pH of Site Water: 7.82 (pre) / 6.89 (post)

	A				B				C				Average			
Vial Weight (g):	9.55				9.47				9.55				9.523333333			
Soil Weight (g):	7				7				7				7			
Vial+Soil+Solution Weight (g):	60.49				61.65				62.64				61.59333333			
Solution Weight (g):	43.94				45.18				46.09				45.07			
pH of Solution (final)	6.94				7.03				7.03				7			
	As	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**
Solution Results (µg/mL):	0.29325	0.1203	0.37722	4.4497	0.34368	0.11307	0.55058	4.3933	0.32225	0.12526	0.36639	4.4746	0.3197267	0.1195433	0.4313967	4.4392
Total µg added (µg):	12.885405	5.285982	16.575047	195.51982	15.527462	5.1085026	24.875204	198.48929	14.852503	5.7732334	16.886915	206.23431	14.42179	5.3892393	19.445722	200.08114
Solute analysis (µg/mL):	0.006613	0.042507	0.017282	0.6096	0.005714	0.042187	0.012644	0.647	0.0064	0.043094	0.009299	0.65869	0.006242	0.042596	0.013075	0.638430
Soil concentration (µg/mL):	0.286637	0.077793	0.359938	3.8401	0.337966	0.070883	0.537936	3.7463	0.31585	0.082166	0.357091	3.81591	0.3134843	0.0769473	0.4183217	3.80077
Total µg in soil (µg):	12.59483	3.4182244	15.815676	168.73399	15.269304	3.2024939	24.303948	169.25783	14.557527	3.7870309	16.458324	175.87529	14.140553	3.4692498	18.859316	171.28904
Conc. in soil (µg/g):	1.7992614	0.4883178	2.2593822	24.104856	2.1813291	0.4574991	3.4719926	24.179691	2.0796466	0.5410044	2.3511892	25.125042	2.0200791	0.4956071	2.694188	24.469863
Rd calculation (mL/g):	272.07945	11.487938	130.73616	39.542087	381.75168	10.844552	274.59606	37.37201	324.94479	12.554054	252.84323	38.143955	326.25864	11.628848	219.39182	38.352684

Notes:

Solution weight = assume 1 g = 1 mL

$$\text{Rd calculation} = \frac{\text{mass of solute on the solid phase/unit mass of solid phase}}{\text{mass of solute in solution/unit volume of the liquid phase}}$$

Legend Technical Services, Inc.

Soil Adsorption Spreadsheet - ASTM D4319

Sample ID: GW-009 (0901493-01)

Time of Exposure: 192 hours

Challenge Solution: BB

pH of Site Water: 7.80 (pre) / 7.70 (post)

	A				B				C				Average			
Vial Weight (g):	9.47				9.47				9.47				9.47			
Soil Weight (g):	7				7				7				7			
Vial+Soil+Solution Weight (g):	61.46				61.05				61.6				61.37			
Solution Weight (g):	44.99				44.58				45.13				44.9			
pH of Solution (final)	7.31				7.31				7.3				7.306666667			
	As	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**
Solution Results (µg/mL):	0.008607	0.009712	0.025727	0.084759	0.008202	0.009604	0.021014	0.078707	0.006823	0.009433	0.023163	0.083761	0.0078773	0.009583	0.0233013	0.082409
Total µg added (µg):	0.3872289	0.4369429	1.1574577	3.8133074	0.3656452	0.4281463	0.9368041	3.5087581	0.307922	0.4257113	1.0453462	3.7801339	0.3535987	0.4302668	1.046536	3.7007331
Solute analysis (µg/mL): *	0.00016	0.003728	0.005816	0.010958	0.00016	0.003121	0.005977	0.012339	0.00016	0.001736	0.006142	0.012867	0.000160	0.002862	0.005978	0.012055
Soil concentration (µg/mL):	0.008447	0.005984	0.019911	0.073801	0.008042	0.006483	0.015037	0.066368	0.006663	0.007697	0.017021	0.070894	0.0077173	0.0067213	0.017323	0.0703543
Total µg in soil (µg):	0.3800305	0.2692202	0.8957959	3.320307	0.3585124	0.2890121	0.6703495	2.9586854	0.3007012	0.3473656	0.7681577	3.1994462	0.3464147	0.301866	0.778101	3.1594796
Conc. in soil (µg/g):	0.0542901	0.03846	0.1279708	0.4743296	0.0512161	0.0412874	0.0957642	0.4226693	0.0429573	0.0496237	0.1097368	0.4570637	0.0494878	0.0431237	0.1111573	0.4513542
Rd calculation (mL/g):	339.31297	10.31653	22.00324	43.286144	320.10032	13.228917	16.02212	34.254749	268.48321	28.585057	17.866626	35.522169	309.29883	17.376834	18.630662	37.687687

Notes:

Solution weight = assume 1 g = 1 mL

** Values below MDL or negative if arsenic = 0.00016.*

$$\text{Rd calculation} = \frac{\text{mass of solute on the solid phase/unit mass of solid phase}}{\text{mass of solute in solution/unit volume of the liquid phase}}$$

Legend Technical Services, Inc.

Soil Adsorption Spreadsheet - ASTM D4319

Sample ID: GW-009 (0901493-01)

Time of Exposure: 192 hours

Challenge Solution: CC

pH of Site Water: 7.84 (pre) / 7.46 (post)

	A				B				C				Average			
Vial Weight (g):	9.47				9.47				9.55				9.496666667			
Soil Weight (g):	7				7				7				7			
Vial+Soil+Solution Weight (g):	61.85				61.04				61.36				61.41666667			
Solution Weight (g):	45.38				44.57				44.81				44.92			
pH of Solution (final)	7.22				7.28				7.38				7.293333333			
	As	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**
Solution Results (µg/mL):	0.021332	0.016669	0.081011	0.29269	0.020978	0.014981	0.081711	0.28344	0.023902	0.017064	0.095764	0.31983	0.0220707	0.016238	0.086162	0.2986533
Total µg added (µg):	0.9680462	0.7564392	3.6762792	13.282272	0.9349895	0.6677032	3.6418593	12.632921	1.0710486	0.7646378	4.2911848	14.331582	0.9913614	0.7295934	3.8697744	13.415592
Solute analysis (µg/mL): *	0.00016	0.004238	0.005634	0.025198	0.00016	0.004536	0.005459	0.02495	0.00016	0.002944	0.005016	0.021689	0.000160	0.003906	0.005370	0.023946
Soil concentration (µg/mL):	0.021172	0.012431	0.075377	0.267492	0.020818	0.010445	0.076252	0.25849	0.023742	0.01412	0.090748	0.298141	0.0219107	0.012332	0.0807923	0.2747077
Total µg in soil (µg):	0.9607854	0.5641188	3.4206083	12.138787	0.9278583	0.4655337	3.3985516	11.520899	1.063879	0.6327172	4.0664179	13.359698	0.9841742	0.5541232	3.6285259	12.339795
Conc. in soil (µg/g):	0.1372551	0.0805884	0.4886583	1.7341124	0.1325512	0.0665048	0.4855074	1.6458428	0.1519827	0.0903882	0.5809168	1.9085283	0.1405963	0.0791605	0.5183608	1.7628278
Rd calculation (mL/g):	857.84407	19.015667	86.733817	68.819447	828.44488	14.661554	88.937054	65.965642	949.89198	30.702504	115.81277	87.995219	878.72698	21.459908	97.161213	74.260103

Notes:

Solution weight = assume 1 g = 1 mL

** Values below MDL or negative if arsenic = 0.00016.*

$$\text{Rd calculation} = \frac{\text{mass of solute on the solid phase/unit mass of solid phase}}{\text{mass of solute in solution/unit volume of the liquid phase}}$$

Legend Technical Services, Inc.

Soil Adsorption Spreadsheet - ASTM D4319

Sample ID: GW-009 (0901493-01)

Time of Exposure: 192 hours

Challenge Solution: DD

pH of Site Water: 7.81 (pre) / 7.20 (post)

	A				B				C				Average			
Vial Weight (g):	9.47				9.55				9.55				9.523333333			
Soil Weight (g):	7.04				7.04				7.09				7.056666667			
Vial+Soil+Solution Weight (g):	62.04				61.22				61.48				61.58			
Solution Weight (g):	45.53				44.63				44.84				45			
pH of Solution (final)	7.24				7.29				7.31				7.28			
	As	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**
Solution Results (µg/mL):	0.044614	0.02755	0.16404	0.52088	0.053043	0.03206	0.18388	0.58427	0.051238	0.029739	0.17825	0.56809	0.0496317	0.029783	0.17539	0.5577467
Total µg added (µg):	2.0312754	1.2543515	7.4687412	23.715666	2.3673091	1.4308378	8.2065644	26.07597	2.2975119	1.3334968	7.99273	25.473156	2.2320321	1.339562	7.8893452	25.088264
Solute analysis (µg/mL): *	0.00016	0.008171	0.008276	0.045998	0.00016	0.007678	0.006341	0.043218	0.00016	0.008263	0.006489	0.042427	0.000160	0.008037	0.007035	0.043881
Soil concentration (µg/mL):	0.044454	0.019379	0.155764	0.474882	0.052883	0.024382	0.177539	0.541052	0.051078	0.021476	0.171761	0.525663	0.0494717	0.0217457	0.1683547	0.5138657
Total µg in soil (µg):	2.0239906	0.8823259	7.0919349	21.621377	2.3601683	1.0881687	7.9235656	24.147151	2.2903375	0.9629838	7.7017632	23.570729	2.2248321	0.9778261	7.5724212	23.113086
Conc. in soil (µg/g):	0.2874987	0.1253304	1.0073771	3.0712184	0.3352512	0.1545694	1.1255065	3.429993	0.3230377	0.1358228	1.0862854	3.3245034	0.3152625	0.1385742	1.0730563	3.2752383
Rd calculation (mL/g):	1796.8667	15.338438	121.72271	66.76852	2095.3199	20.131468	177.49668	79.364918	2018.9858	16.437471	167.40412	78.358201	1970.3908	17.302459	155.54117	74.830546

Notes:

Solution weight = assume 1 g = 1 mL

** Values below MDL or negative if arsenic = 0.00016.*

$$\text{Rd calculation} = \frac{\text{mass of solute on the solid phase/unit mass of solid phase}}{\text{mass of solute in solution/unit volume of the liquid phase}}$$

Legend Technical Services, Inc.

Soil Adsorption Spreadsheet - ASTM D4319

Sample ID: GW-009 (0901493-01)

Time of Exposure: 192 hours

Challenge Solution: EE

pH of Site Water: 7.82 (pre) / 6.89 (post)

	A				B				C				Average			
Vial Weight (g):	9.47				9.47				9.47				9.47			
Soil Weight (g):	7				7				7				7			
Vial+Soil+Solution Weight (g):	62.03				62.82				62.76				62.53666667			
Solution Weight (g):	45.56				46.35				46.29				46.06666667			
pH of Solution (final)	7.2				7.09				7.08				7.123333333			
	As	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**
Solution Results (µg/mL):	0.20264	0.088632	0.2384	3.3254	0.19672	0.097153	0.23072	3.7325	0.30422	0.099592	0.30888	3.8377	0.2345267	0.0951257	0.2593333	3.6318667
Total µg added (µg):	9.2322784	4.0380739	10.861504	151.50522	9.117972	4.5030416	10.693872	173.00138	14.082344	4.6101137	14.298055	177.64713	10.810865	4.3837431	11.951144	167.38458
Solute analysis (µg/mL): *	0.00016	0.026234	0.014028	0.4987	0.00016	0.031305	0.007698	0.53818	0.00016	0.028088	0.00882	0.49105	0.000160	0.028542	0.010182	0.509310
Soil concentration (µg/mL):	0.20248	0.062398	0.224372	2.8267	0.19656	0.065848	0.223022	3.19432	0.30406	0.071504	0.30006	3.34665	0.2343667	0.0665833	0.2491513	3.1225567
Total µg in soil (µg):	9.2249888	2.8428529	10.222388	128.78445	9.110556	3.0520548	10.33707	148.05673	14.074937	3.3099202	13.889777	154.91643	10.803494	3.0682759	11.483078	143.9192
Conc. in soil (µg/g):	1.3178555	0.4061218	1.4603412	18.397779	1.301508	0.4360078	1.4767242	21.150962	2.0107053	0.4728457	1.9842539	22.130918	1.5433563	0.4383251	1.6404398	20.559886
Rd calculation (mL/g):	8236.5971	15.480744	104.10188	36.891476	8134.425	13.927738	191.8322	39.300906	12566.908	16.83444	224.9721	45.068564	9645.9768	15.414307	173.63539	40.420315

Notes:

Solution weight = assume 1 g = 1 mL

** Values below MDL or negative if arsenic = 0.00016.*

$$\text{Rd calculation} = \frac{\text{mass of solute on the solid phase/unit mass of solid phase}}{\text{mass of solute in solution/unit volume of the liquid phase}}$$

Legend Technical Services, Inc.

Soil Adsorption Spreadsheet - ASTM D4319

Sample ID: RS-21 (0901493-02)

Time of Exposure: 48 hours

Challenge Solution: AA

pH of Site Water: 7.84 (pre) / 7.71 (post)

	A				B				C				Average			
Vial Weight (g):	9.56				9.48				9.56				9.533333333			
Soil Weight (g):	7				7				7				7			
Vial+Soil+Solution Weight (g):	57.66				58.22				59.46				58.44666667			
Solution Weight (g):	41.1				41.74				42.9				41.91333333			
pH of Solution (final)	8.31				8.55				8.34				8.40			
	As	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**
Solution Results (µg/mL):	0.0059708	0.0046433	0.0235688	0.0426282	0.0057599	0.0045435		0.037056	0.0059589	0.0046836		0.0365004	0.0058965	0.0046235	0.0235688	0.0387282
Total µg added (µg):	0.2453999	0.1908396	0.9686777	1.752019	0.2404182	0.1896457	0	1.5467174	0.2556368	0.2009264	0	1.5658672	0.2471516	0.1938039	0.3228926	1.6215345
Solute analysis (µg/mL):	0.001749	0.003876	0.0064098	0.0249702	0.0016878	0.0039535	0.0060887	0.0247907	0.002284	0.0041067	0.006308	0.0238148	0.001907	0.003979	0.006269	0.024525
Soil concentration (µg/mL):	0.0042218	0.0007673	0.017159	0.017658	0.0040721	0.00059	-0.006089	0.0122653	0.0036749	0.0005769	-0.006308	0.0126856	0.0039896	0.0006447	0.0015874	0.014203
Total µg in soil (µg):	0.173516	0.031536	0.7052349	0.7257438	0.1699695	0.0246266	-0.254142	0.5119536	0.1576532	0.024749	-0.270613	0.5442122	0.1670462	0.0269705	0.0601598	0.5939699
Conc. in soil (µg/g):	0.024788	0.0045051	0.1007478	0.1036777	0.0242814	0.0035181	-0.036306	0.0731362	0.0225219	0.0035356	-0.038659	0.0777446	0.0238637	0.0038529	0.0085943	0.0848528
Rd calculation (mL/g):	14.172668	1.1623187	15.717783	4.1520567	14.386391	0.8898661	-5.962857	2.9501479	9.8607212	0.860928	-6.128571	3.26455	12.806594	0.9710376	1.2087847	3.4555849

Notes:

Solution weight = assume 1 g = 1 mL

$$\text{Rd calculation} = \frac{\text{mass of solute on the solid phase/unit mass of solid phase}}{\text{mass of solute in solution/unit volume of the liquid phase}}$$

Legend Technical Services, Inc.

Soil Adsorption Spreadsheet - ASTM D4319

Sample ID: **RS-21 (0901493-02)**

Time of Exposure: **48 hours**

Challenge Solution: **BB**

pH of Site Water: **7.80 (pre) / 7.70 (post)**

	A				B				C				Average			
Vial Weight (g):	9.47				9.55				9.47				9.496666667			
Soil Weight (g):	7				7				7				7			
Vial+Soil+Solution Weight (g):	58.67				59.71				59.36				59.24666667			
Solution Weight (g):	42.2				43.16				42.89				42.75			
pH of Solution (final)	8.34				8.27				8.38				8.33			
	As	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**
Solution Results (µg/mL):	0.007282	0.010656	0.023702	0.082723	0.005494	0.008818	0.02296	0.076136	0.005872	0.008218	0.024208	0.078828	0.006216	0.0092307	0.0236233	0.079229
Total µg added (µg):	0.3073004	0.4496832	1.0002244	3.4909106	0.237121	0.3805849	0.9909536	3.2860298	0.2518501	0.35247	1.0382811	3.3809329	0.2654238	0.394246	1.0098197	3.3859578
Solute analysis (µg/mL): *	0.00016	0.009023	0.004876	0.030618	0.001408	0.008672	0.004458	0.028147	0.000831	0.008818	0.004623	0.02918	0.000800	0.008838	0.004652	0.029315
Soil concentration (µg/mL):	0.007122	0.001633	0.018826	0.052105	0.004086	0.000146	0.018502	0.047989	0.005041	-0.0006	0.019585	0.049648	0.0054163	0.000393	0.018971	0.049914
Total µg in soil (µg):	0.3005484	0.0689126	0.7944572	2.198831	0.1763518	0.0063014	0.7985463	2.0712052	0.2162085	-0.025734	0.8400007	2.1294027	0.2310362	0.0164933	0.8110014	2.1331463
Conc. in soil (µg/g):	0.0429355	0.0098447	0.1134939	0.3141187	0.0251931	0.0009002	0.114078	0.2958865	0.0308869	-0.003676	0.1200001	0.3042004	0.0330052	0.0023562	0.1158573	0.3047352
Rd calculation (mL/g):	268.34679	1.0910625	23.276023	10.259283	17.892833	0.1038047	25.589512	10.512185	37.168384	-0.416907	25.957191	10.424962	107.80267	0.2593201	24.940909	10.39881

Notes:

Solution weight = assume 1 g = 1 mL

** Values below MDL or negative if arsenic = 0.00016.*

$$\text{Rd calculation} = \frac{\text{mass of solute on the solid phase/unit mass of solid phase}}{\text{mass of solute in solution/unit volume of the liquid phase}}$$

Legend Technical Services, Inc.

Soil Adsorption Spreadsheet - ASTM D4319

Sample ID: **RS-21 (0901493-02)**

Time of Exposure: **48 hours**

Challenge Solution: **CC**

pH of Site Water: **7.84 (pre) / 7.46 (post)**

	A				B				C				Average			
Vial Weight (g):	9.56				9.55				9.47				9.526666667			
Soil Weight (g):	7				7				7				7			
Vial+Soil+Solution Weight (g):	61.17				61.22				61.16				61.18333333			
Solution Weight (g):	44.61				44.67				44.69				44.65666667			
pH of Solution (final)	7.98				8.06				7.85				7.963333333			
	As	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**
Solution Results (µg/mL):	0.037937	0.023174	0.11321	0.37272	0.042132	0.024199	0.116726	0.41826	0.037183	0.022614	0.11126	0.37362	0.039084	0.023329	0.113732	0.3882
Total µg added (µg):	1.6923696	1.0337921	5.0502981	16.627039	1.8820364	1.0809693	5.2141504	18.683674	1.6617083	1.0106197	4.9722094	16.697078	1.7453714	1.0417937	5.078886	17.33593
Solute analysis (µg/mL):	0.005609	0.020549	0.007231	0.14148	0.006524	0.021763	0.006793	0.1282	0.003335	0.020198	0.007247	0.15106	0.005156	0.020837	0.007090	0.140247
Soil concentration (µg/mL):	0.032328	0.002625	0.105979	0.23124	0.035608	0.002436	0.109933	0.29006	0.033848	0.002416	0.104013	0.22256	0.033928	0.0024923	0.1066417	0.2479533
Total µg in soil (µg):	1.4421521	0.1171013	4.7277232	10.315616	1.5906094	0.1088161	4.9107071	12.95698	1.5126671	0.107971	4.648341	9.9462064	1.5151429	0.1112961	4.7622571	11.072934
Conc. in soil (µg/g):	0.2060217	0.0167288	0.675389	1.4736595	0.2272299	0.0155452	0.7015296	1.8509972	0.2160953	0.0154244	0.6640487	1.4208866	0.216449	0.0158994	0.6803224	1.5818478
Rd calculation (mL/g):	36.730563	0.8140907	93.401885	10.416027	34.829845	0.7142931	103.27243	14.438355	64.796193	0.7636615	91.630842	9.4061077	45.4522	0.7640151	96.101717	11.420163

Notes:

Solution weight = assume 1 g = 1 mL

$$\text{Rd calculation} = \frac{\text{mass of solute on the solid phase/unit mass of solid phase}}{\text{mass of solute in solution/unit volume of the liquid phase}}$$

Legend Technical Services, Inc.

Soil Adsorption Spreadsheet - ASTM D4319

Sample ID: RS-21 (0901493-02)

Time of Exposure: 48 hours

Challenge Solution: DD

pH of Site Water: 7.81 (pre) / 7.20 (post)

	A				B				C				Average			
Vial Weight (g):	9.47				9.48				9.47				9.473333333			
Soil Weight (g):	7				7.01				7.01				7.006666667			
Vial+Soil+Solution Weight (g):	62.24				62.89				61.78				62.30333333			
Solution Weight (g):	45.77				46.4				45.3				45.82333333			
pH of Solution (final)	6.91				7.72				7.75				7.46			
	As	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**
Solution Results (µg/mL):	0.079973	0.048712	0.34133	0.83082	0.076916	0.04173	0.3154	0.78149	0.087036	0.04922	0.33561	0.8741	0.0813083	0.046554	0.33078	0.8288033
Total µg added (µg):	3.6603642	2.2295482	15.622674	38.026631	3.5689024	1.936272	14.63456	36.261136	3.9427308	2.229666	15.203133	39.59673	3.7239991	2.1318287	15.153456	37.961499
Solute analysis (µg/mL):	0.015167	0.039071	0.016596	0.5511	0.014283	0.034631	0.011574	0.48965	0.014066	0.036535	0.011534	0.47959	0.014505	0.036746	0.013235	0.506780
Soil concentration (µg/mL):	0.064806	0.009641	0.324734	0.27972	0.062633	0.007099	0.303826	0.29184	0.07297	0.012685	0.324076	0.39451	0.066803	0.0098083	0.3175453	0.3220233
Total µg in soil (µg):	2.9661706	0.4412686	14.863075	12.802784	2.9061712	0.3293936	14.097526	13.541376	3.305541	0.5746305	14.680643	17.871303	3.0592943	0.4484309	14.547081	14.738488
Conc. in soil (µg/g):	0.4237387	0.0630384	2.1232965	1.8289692	0.4145751	0.0469891	2.0110594	1.9317227	0.4715465	0.081973	2.0942429	2.5494013	0.4366201	0.0640001	2.0761996	2.1033644
Rd calculation (mL/g):	27.938199	1.6134311	127.94025	3.318761	29.025769	1.3568508	173.75664	3.9451091	33.523852	2.2436832	181.57126	5.3157932	30.162607	1.7379884	161.08939	4.1932211

Notes:

Solution weight = assume 1 g = 1 mL

$$\text{Rd calculation} = \frac{\text{mass of solute on the solid phase/unit mass of solid phase}}{\text{mass of solute in solution/unit volume of the liquid phase}}$$

Legend Technical Services, Inc.

Soil Adsorption Spreadsheet - ASTM D4319

Sample ID: **RS-21 (0901493-02)**

Time of Exposure: **48 hours**

Challenge Solution: **EE**

pH of Site Water: **7.82 (pre) / 6.89 (post)**

	A				B				C				Average			
Vial Weight (g):	9.47				9.55				9.55				9.523333333			
Soil Weight (g):	7				7				7				7			
Vial+Soil+Solution Weight (g):	62.56				61.94				61.03				61.84333333			
Solution Weight (g):	46.09				45.39				44.48				45.32			
pH of Solution (final)	7.21				7.35				7.19				7.25			
	As	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**
Solution Results (µg/mL):	0.15404	0.095099	0.14498	3.524	0.19105	0.099955	0.21244	3.8135	0.22717	0.10459	0.26811	3.9498	0.1907533	0.0998813	0.20851	3.7624333
Total µg added (µg):	7.0997036	4.3831129	6.6821282	162.42116	8.6717595	4.5369575	9.6426516	173.09477	10.104522	4.6521632	11.925533	175.6871	8.6253282	4.5240779	9.4167709	170.40101
Solute analysis (µg/mL):	0.041971	0.079118	0.012349	1.5085	0.070489	0.086543	0.016851	2.1029	0.037671	0.079965	0.011548	1.4266	0.050044	0.081875	0.013583	1.679333
Soil concentration (µg/mL):	0.112069	0.015981	0.132631	2.0155	0.120561	0.013412	0.195589	1.7106	0.189499	0.024625	0.256562	2.5232	0.1407097	0.018006	0.1949273	2.0831
Total µg in soil (µg):	5.1652602	0.7365643	6.1129628	92.894395	5.4722638	0.6087707	8.8777847	77.644134	8.4289155	1.09532	11.411878	112.23194	6.3554798	0.8135517	8.8008751	94.256822
Conc. in soil (µg/g):	0.7378943	0.1052235	0.8732804	13.270628	0.781752	0.0869672	1.268255	11.092019	1.2041308	0.1564743	1.6302683	16.033134	0.9079257	0.1162217	1.2572679	13.46526
Rd calculation (mL/g):	17.581052	1.3299561	70.716689	8.7972342	11.090411	1.0049021	75.26289	5.2746299	31.964397	1.9567847	141.17321	11.238703	20.211953	1.4305476	95.717597	8.4368557

Notes:

Solution weight = assume 1 g = 1 mL

$$\textit{Rd calculation} = \frac{\textit{mass of solute on the solid phase/unit mass of solid phase}}{\textit{mass of solute in solution/unit volume of the liquid phase}}$$

Legend Technical Services, Inc.

Soil Adsorption Spreadsheet - ASTM D4319

Sample ID: RS-21 (0901493-02)

Time of Exposure: 96 hours

Challenge Solution: AA

pH of Site Water: 7.84 (pre) / 7.71 (post)

	A				B				C				Average			
Vial Weight (g):	9.57				9.47				9.55				9.53			
Soil Weight (g):	7				7				7				7			
Vial+Soil+Solution Weight (g):	57.55				58.85				58.66				58.35333333			
Solution Weight (g):	40.98				42.38				42.11				41.82333333			
pH of Solution (final)	7.47				7.4				7.46				7.443333333			
	As	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**
Solution Results (µg/mL):	0.0071614	0.0045882	0.0362852	0.0447422	0.0064967	0.0045273	0.0350434	0.0425692	0.0067853	0.0046815	0.0344637	0.0429781	0.0068145	0.004599	0.0352641	0.0434298
Total µg added (µg):	0.2934742	0.1880244	1.4869675	1.8335354	0.2753301	0.191867	1.4851393	1.8040827	0.285729	0.197138	1.4512664	1.8098078	0.2848444	0.1923431	1.4744577	1.8158086
Solute analysis (µg/mL):	0.0019147	0.0035256	0.0088521	0.0289931	0.0011085	0.0034757	0.0091725	0.0351967	0.0013987	0.0035594	0.0085008	0.0315643	0.001474	0.003520	0.008842	0.031918
Soil concentration (µg/mL):	0.0052467	0.0010626	0.0274331	0.0157491	0.0053882	0.0010516	0.0258709	0.0073725	0.0053866	0.0011221	0.0259629	0.0114138	0.0053405	0.0010788	0.0264223	0.0115118
Total µg in soil (µg):	0.2150098	0.0435453	1.1242084	0.6453981	0.2283519	0.0445668	1.0964087	0.3124466	0.2268297	0.0472516	1.0932977	0.4806351	0.2233971	0.0451213	1.1046383	0.4794933
Conc. in soil (µg/g):	0.0307157	0.0062208	0.1606012	0.0921997	0.0326217	0.0063667	0.1566298	0.0446352	0.0324042	0.0067502	0.1561854	0.0686622	0.0319139	0.0064459	0.1578055	0.068499
Rd calculation (mL/g):	16.042033	1.7644554	18.142724	3.1800577	29.428689	1.8317711	17.076023	1.268165	23.167403	1.8964525	18.373022	2.1753107	22.879375	1.830893	17.863923	2.2078445

Notes:

Solution weight = assume 1 g = 1 mL

$$\textit{Rd calculation} = \frac{\textit{mass of solute on the solid phase/unit mass of solid phase}}{\textit{mass of solute in solution/unit volume of the liquid phase}}$$

Legend Technical Services, Inc.

Soil Adsorption Spreadsheet - ASTM D4319

Sample ID: **RS-21 (0901493-02)**

Time of Exposure: **96 hours**

Challenge Solution: **BB**

pH of Site Water: **7.80 (pre) / 7.70 (post)**

	A				B				C				Average			
Vial Weight (g):	9.47				9.48				9.55				9.5			
Soil Weight (g):	7				7				7				7			
Vial+Soil+Solution Weight (g):	60.08				60.62				61.37				60.69			
Solution Weight (g):	43.61				44.14				44.82				44.19			
pH of Solution (final)	7.35				7.37				7.45				7.39			
	As	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**
Solution Results (µg/mL):	0.005036	0.008974	0.022342	0.07684	0.00543	0.009245	0.021574	0.073427	0.005984	0.007968	0.021566	0.071125	0.0054833	0.008729	0.0218273	0.0737973
Total µg added (µg):	0.21962	0.3913561	0.9743346	3.3509924	0.2396802	0.4080743	0.9522764	3.2410678	0.2682029	0.3571258	0.9665881	3.1878225	0.242501	0.3855187	0.9643997	3.2599609
Solute analysis (µg/mL): *	0.00016	0.005859	0.010943	0.033367	0.00016	0.007458	0.006606	0.033346	0.001372	0.007448	0.01751	0.042116	0.000564	0.006922	0.011686	0.036276
Soil concentration (µg/mL):	0.004876	0.003115	0.011399	0.043473	0.00527	0.001787	0.014968	0.040081	0.004612	0.00052	0.004056	0.029009	0.0049193	0.0018073	0.010141	0.037521
Total µg in soil (µg):	0.2126424	0.1358452	0.4971104	1.8958575	0.2326178	0.0788782	0.6606875	1.7691753	0.2067098	0.0233064	0.1817899	1.3001834	0.2173233	0.0793432	0.4465293	1.6550721
Conc. in soil (µg/g):	0.0303775	0.0194065	0.0710158	0.2708368	0.0332311	0.0112683	0.0943839	0.2527393	0.02953	0.0033295	0.02597	0.1857405	0.0310462	0.0113347	0.0637899	0.2364389
Rd calculation (mL/g):	189.85925	3.3122461	6.4896071	8.1169056	207.69446	1.5109026	14.287607	7.5792999	21.523307	0.4470308	1.4831518	4.4102119	139.69234	1.7567265	7.4201219	6.7021391

Notes:

Solution weight = assume 1 g = 1 mL

** Values below MDL or negative if arsenic = 0.00016.*

$$\text{Rd calculation} = \frac{\text{mass of solute on the solid phase/unit mass of solid phase}}{\text{mass of solute in solution/unit volume of the liquid phase}}$$

Legend Technical Services, Inc.

Soil Adsorption Spreadsheet - ASTM D4319

Sample ID: **RS-21 (0901493-02)**

Time of Exposure: **96 hours**

Challenge Solution: **CC**

pH of Site Water: **7.84 (pre) / 7.46 (post)**

	A				B				C				Average			
Vial Weight (g):	9.47				9.55				9.55				9.523333333			
Soil Weight (g):	7				7				7				7			
Vial+Soil+Solution Weight (g):	61.88				60.76				61.01				61.21666667			
Solution Weight (g):	45.41				44.21				44.46				44.69333333			
pH of Solution (final)	7.51				7.57				7.56				7.546666667			
	As	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**
Solution Results (µg/mL):	0.040603	0.023728	0.11129	0.43024	0.039365	0.023289	0.11678	0.42842	0.04177	0.025315	0.11359	0.42792	0.0405793	0.0241107	0.1138867	0.42886
Total µg added (µg):	1.8437822	1.0774885	5.0536789	19.537198	1.7403267	1.0296067	5.1628438	18.940448	1.8570942	1.1255049	5.0502114	19.025323	1.8137344	1.0775334	5.0889114	19.167657
Solute analysis (µg/mL):	0.001311	0.016676	0.007277	0.10843	0.002662	0.018155	0.00748	0.10224	0.001148	0.017756	0.007061	0.10636	0.001707	0.017529	0.007273	0.105677
Soil concentration (µg/mL):	0.039292	0.007052	0.104013	0.32181	0.036703	0.005134	0.1093	0.32618	0.040622	0.007559	0.106529	0.32156	0.0388723	0.0065817	0.106614	0.3231833
Total µg in soil (µg):	1.7842497	0.3202313	4.7232303	14.613392	1.6226396	0.2269741	4.832153	14.420418	1.8060541	0.3360731	4.7362793	14.296558	1.7376478	0.2944262	4.7638876	14.443456
Conc. in soil (µg/g):	0.2548928	0.0457473	0.6747472	2.0876274	0.2318057	0.0324249	0.6903076	2.0600597	0.2580077	0.0480104	0.6766113	2.0423654	0.2482354	0.0420609	0.6805554	2.0633508
Rd calculation (mL/g):	194.42625	2.7433036	92.723264	19.253227	87.079512	1.7860026	92.287108	20.149254	224.74541	2.7039	95.823727	19.202382	168.75039	2.4110687	93.611366	19.534954

Notes:

Solution weight = assume 1 g = 1 mL

$$\text{Rd calculation} = \frac{\text{mass of solute on the solid phase/unit mass of solid phase}}{\text{mass of solute in solution/unit volume of the liquid phase}}$$

Legend Technical Services, Inc.

Soil Adsorption Spreadsheet - ASTM D4319

Sample ID: **RS-21 (0901493-02)**

Time of Exposure: **96 hours**

Challenge Solution: **DD**

pH of Site Water: **7.81 (pre) / 7.20 (post)**

	A				B				C				Average			
Vial Weight (g):	9.47				9.55				9.47				9.496666667			
Soil Weight (g):	7				7				7				7			
Vial+Soil+Solution Weight (g):	61.54				62.42				62.06				62.00666667			
Solution Weight (g):	45.07				45.87				45.59				45.51			
pH of Solution (final)	7.5				7.42				7.47				7.463333333			
	As	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**
Solution Results (µg/mL):	0.094833	0.053955	0.30458	0.92693	0.097129	0.052957	0.29521	0.92691	0.093616	0.051871	0.29364	0.90363	0.0951927	0.0529277	0.29781	0.9191567
Total µg added (µg):	4.2741233	2.4317519	13.727421	41.776735	4.4553072	2.4291376	13.541283	42.517362	4.2679534	2.3647989	13.387048	41.196492	4.3324613	2.4085628	13.551917	41.830196
Solute analysis (µg/mL):	0.006922	0.033927	0.008594	0.21096	0.006538	0.033716	0.009415	0.21838	0.005882	0.033381	0.008798	0.20847	0.006447	0.033675	0.008936	0.212603
Soil concentration (µg/mL):	0.087911	0.020028	0.295986	0.71597	0.090591	0.019241	0.285795	0.70853	0.087734	0.01849	0.284842	0.69516	0.0887453	0.019253	0.2888743	0.7065533
Total µg in soil (µg):	3.9621488	0.902662	13.340089	32.268768	4.1554092	0.8825847	13.109417	32.500271	3.9997931	0.8429591	12.985947	31.692344	4.039117	0.8760686	13.145151	32.153794
Conc. in soil (µg/g):	0.5660213	0.1289517	1.905727	4.609824	0.5936299	0.1260835	1.8727738	4.6428959	0.571399	0.1204227	1.8551353	4.5274778	0.5770167	0.1251527	1.8778787	4.5933992
Rd calculation (mL/g):	81.771345	3.800858	221.75087	21.85165	90.796862	3.7395754	198.91384	21.260628	97.14366	3.6075231	210.85875	21.717647	89.903956	3.7159855	210.50782	21.609975

Notes:

Solution weight = assume 1 g = 1 mL

$$\textit{Rd calculation} = \frac{\textit{mass of solute on the solid phase/unit mass of solid phase}}{\textit{mass of solute in solution/unit volume of the liquid phase}}$$

Legend Technical Services, Inc.

Soil Adsorption Spreadsheet - ASTM D4319

Sample ID: **RS-21 (0901493-02)**

Time of Exposure: **96 hours**

Challenge Solution: **EE**

pH of Site Water: **7.82 (pre) / 6.89 (post)**

	A				B				C				Average			
Vial Weight (g):	9.55				9.55				9.55				9.55			
Soil Weight (g):	7				7				7				7			
Vial+Soil+Solution Weight (g):	60.87				62.68				62.65				62.06666667			
Solution Weight (g):	44.32				46.13				46.1				45.51666667			
pH of Solution (final)	7.19				7.25				7.19				7.21			
	As	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**
Solution Results (µg/mL):	0.26064	0.10741	0.40156	4.0052	0.23357	0.10515	0.30612	4.0609	0.22708	0.10244	0.29199	3.8411	0.24043	0.105	0.3332233	3.9690667
Total µg added (µg):	11.551565	4.7604112	17.797139	177.51046	10.774584	4.8505695	14.121316	187.32932	10.468388	4.722484	13.460739	177.07471	10.931512	4.7778216	15.126398	180.63816
Solute analysis (µg/mL):	0.033319	0.07267	0.011944	1.2778	0.042816	0.07767	0.013266	1.379	0.026263	0.06617	0.011407	1.1526	0.034133	0.072170	0.012206	1.269800
Soil concentration (µg/mL):	0.227321	0.03474	0.389616	2.7274	0.190754	0.02748	0.292854	2.6819	0.200817	0.03627	0.280583	2.6885	0.2062973	0.03283	0.3210177	2.6992667
Total µg in soil (µg):	10.074867	1.5396768	17.267781	120.87837	8.799482	1.2676524	13.509355	123.71605	9.2576637	1.672047	12.934876	123.93985	9.3773375	1.4931254	14.570671	122.84476
Conc. in soil (µg/g):	1.4392667	0.2199538	2.4668259	17.268338	1.2570689	0.1810932	1.9299079	17.673721	1.3225234	0.2388639	1.8478395	17.705693	1.3396196	0.2133036	2.0815244	17.549251
Rd calculation (mL/g):	43.196575	3.0267487	206.53264	13.514117	29.359792	2.331572	145.47775	12.816331	50.356905	3.6098512	161.99171	15.361524	40.97109	2.9893907	171.33404	13.897324

Notes:

Solution weight = assume 1 g = 1 mL

$$\textit{Rd calculation} = \frac{\textit{mass of solute on the solid phase/unit mass of solid phase}}{\textit{mass of solute in solution/unit volume of the liquid phase}}$$

Legend Technical Services, Inc.

Soil Adsorption Spreadsheet - ASTM D4319

Sample ID: RS-21 (0901493-02)

Time of Exposure: 144 hours

Challenge Solution: BB

pH of Site Water: 7.80 (pre) / 7.70 (post)

	A				B				C				Average			
Vial Weight (g):	9.47				9.47				9.47				9.47			
Soil Weight (g):	7				7				7				7			
Vial+Soil+Solution Weight (g):	60.86				60.83				60.53				60.74			
Solution Weight (g):	44.39				44.36				44.06				44.27			
pH of Solution (final)	7.69				7.78				7.69				7.72			
	As	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**
Solution Results (µg/mL):	0.007047	0.008088	0.024991	0.072555	0.007394	0.008746	0.019951	0.075399	0.00797	0.011597	0.024115	0.080099	0.0074703	0.009477	0.023019	0.0760177
Total µg added (µg):	0.3128163	0.3590263	1.1093505	3.2207165	0.3279978	0.3879726	0.8850264	3.3446996	0.3511582	0.5109638	1.0625069	3.5291619	0.3306575	0.4193209	1.0189613	3.3648593
Solute analysis (µg/mL):	0.000722	0.006162	0.006482	0.036592	0.000584	0.006949	0.006092	0.033615	0.00026	0.006427	0.006863	0.041213	0.000522	0.006513	0.006479	0.037140
Soil concentration (µg/mL):	0.006325	0.001926	0.018509	0.035963	0.00681	0.001797	0.013859	0.041784	0.00771	0.00517	0.017252	0.038886	0.0069483	0.0029643	0.01654	0.0388777
Total µg in soil (µg):	0.2807668	0.0854951	0.8216145	1.5963976	0.3020916	0.0797149	0.6147852	1.8535382	0.3397026	0.2277902	0.7601231	1.7133172	0.3075203	0.1310001	0.7321743	1.7210843
Conc. in soil (µg/g):	0.0401095	0.0122136	0.1173735	0.2280568	0.0431559	0.0113878	0.0878265	0.2647912	0.0485289	0.0325415	0.108589	0.2447596	0.0439315	0.0187143	0.1045963	0.2458692
Rd calculation (mL/g):	55.553374	1.9820823	18.107606	6.2324223	73.897162	1.6387747	14.416688	7.8771732	186.64978	5.0632421	15.822383	5.9388929	105.36677	2.8946997	16.115559	6.6828295

Notes:

Solution weight = assume 1 g = 1 mL

$$\text{Rd calculation} = \frac{\text{mass of solute on the solid phase/unit mass of solid phase}}{\text{mass of solute in solution/unit volume of the liquid phase}}$$

Legend Technical Services, Inc.

Soil Adsorption Spreadsheet - ASTM D4319

Sample ID: RS-21 (0901493-02)

Time of Exposure: 144 hours

Challenge Solution: CC

pH of Site Water: 7.84 (pre) / 7.46 (post)

	A				B				C				Average			
Vial Weight (g):	9.55				9.47				9.47				9.496666667			
Soil Weight (g):	7				7				7				7			
Vial+Soil+Solution Weight (g):	60.29				60.58				61.27				60.71333333			
Solution Weight (g):	43.74				44.11				44.8				44.21666667			
pH of Solution (final)	7.3				7.31				7.31				7.306666667			
	As	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**
Solution Results (µg/mL):	0.055684	0.020918	0.089406	0.35238	0.041374	0.025619	0.10726	0.42031	0.034557	0.019445	0.093462	0.36027	0.0438717	0.021994	0.0967093	0.3776533
Total µg added (µg):	2.4356182	0.9149533	3.9106184	15.413101	1.8250071	1.1300541	4.7312386	18.539874	1.5481536	0.871136	4.1870976	16.140096	1.9362596	0.9720478	4.2763182	16.69769
Solute analysis (µg/mL):	0.002258	0.014245	0.006705	0.076483	0.002296	0.017998	0.007165	0.086267	0.002581	0.016001	0.006481	0.087795	0.002378	0.016081	0.006784	0.083515
Soil concentration (µg/mL):	0.053426	0.006673	0.082701	0.275897	0.039078	0.007621	0.100095	0.334043	0.031976	0.003444	0.086981	0.272475	0.0414933	0.0059127	0.0899257	0.2941383
Total µg in soil (µg):	2.3368532	0.291877	3.6173417	12.067735	1.7237306	0.3361623	4.4151905	14.734637	1.4325248	0.1542912	3.8967488	12.20688	1.8310362	0.2607768	3.976427	13.003084
Conc. in soil (µg/g):	0.3338362	0.0416967	0.5167631	1.7239621	0.2462472	0.0480232	0.6307415	2.1049481	0.2046464	0.0220416	0.5566784	1.74384	0.2615766	0.0372538	0.568061	1.8575834
Rd calculation (mL/g):	147.84596	2.9271125	77.071306	22.540461	107.25053	2.6682513	88.030913	24.400386	79.289578	1.3775139	85.893905	19.862635	111.46202	2.3242926	83.665375	22.267827

Notes:

Solution weight = assume 1 g = 1 mL

$$\text{Rd calculation} = \frac{\text{mass of solute on the solid phase/unit mass of solid phase}}{\text{mass of solute in solution/unit volume of the liquid phase}}$$

Legend Technical Services, Inc.

Soil Adsorption Spreadsheet - ASTM D4319

Sample ID: RS-21 (0901493-02)

Time of Exposure: 144 hours

Challenge Solution: DD

pH of Site Water: 7.81 (pre) / 7.20 (post)

	A				B				C				Average			
Vial Weight (g):	9.56				9.55				9.47				9.526666667			
Soil Weight (g):	7.04				7.05				7.07				7.053333333			
Vial+Soil+Solution Weight (g):	61.23				61.71				62.75				61.89666667			
Solution Weight (g):	44.63				45.11				46.21				45.31666667			
pH of Solution (final)	7.07				6.92				6.96				6.983333333			
	As	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**
Solution Results (µg/mL):	0.087313	0.04999	0.34771	0.86585	0.079794	0.045519	0.29491	0.82771	0.082769	0.046861	0.32988	0.83542	0.083292	0.0474567	0.3241667	0.8429933
Total µg added (µg):	3.8967792	2.2310537	15.518297	38.642886	3.5995073	2.0533621	13.30339	37.337998	3.8247555	2.1654468	15.243755	38.604758	3.7736807	2.1499542	14.688481	38.195214
Solute analysis (µg/mL):	0.004569	0.02509	0.007998	0.24573	0.004559	0.025006	0.008531	0.26346	0.005334	0.027065	0.008007	0.25759	0.004821	0.025720	0.008179	0.255593
Soil concentration (µg/mL):	0.082744	0.0249	0.339712	0.62012	0.075235	0.020513	0.286379	0.56425	0.077435	0.019796	0.321873	0.57783	0.0784713	0.0217363	0.315988	0.5874
Total µg in soil (µg):	3.6928647	1.111287	15.161347	27.675956	3.3938509	0.9253414	12.918557	25.453318	3.5782714	0.9147732	14.873751	26.701524	3.5549956	0.9838005	14.317885	26.610266
Conc. in soil (µg/g):	0.5245546	0.1578533	2.1536004	3.9312437	0.4813973	0.1312541	1.8324194	3.6103996	0.5061204	0.129388	2.1037838	3.7767361	0.5040241	0.1394985	2.0299345	3.7727931
Rd calculation (mL/g):	114.80732	6.2914813	269.26736	15.998224	105.59274	5.2489044	214.79538	13.703787	94.885718	4.7806392	262.74307	14.661812	105.09526	5.4403417	248.93527	14.787941

Notes:

Solution weight = assume 1 g = 1 mL

$$\text{Rd calculation} = \frac{\text{mass of solute on the solid phase/unit mass of solid phase}}{\text{mass of solute in solution/unit volume of the liquid phase}}$$

Legend Technical Services, Inc.

Soil Adsorption Spreadsheet - ASTM D4319

Sample ID: **RS-21 (0901493-02)**

Time of Exposure: **144 hours**

Challenge Solution: **EE**

pH of Site Water: **7.82 (pre) / 6.89 (post)**

	A				B				C				Average			
Vial Weight (g):	9.47				9.55				9.47				9.496666667			
Soil Weight (g):	7				7				7				7			
Vial+Soil+Solution Weight (g):	62.66				62.08				62.61				62.45			
Solution Weight (g):	46.19				45.53				46.14				45.95333333			
pH of Solution (final)	7.15				7.16				7.14				7.15			
	As	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**
Solution Results (µg/mL):	0.29325	0.1203	0.37722	4.4497	0.34368	0.11307	0.55058	4.3933	0.32225	0.12526	0.36639	4.4746	0.3197267	0.1195433	0.4313967	4.4392
Total µg added (µg):	13.545218	5.556657	17.423792	205.53164	15.64775	5.1480771	25.067907	200.02695	14.868615	5.7794964	16.905235	206.45804	14.687194	5.4947435	19.798978	204.00555
Solute analysis (µg/mL):	0.032462	0.082475	0.012907	1.2912	0.033097	0.08039	0.012132	1.2873	0.032258	0.082108	0.013804	1.2598	0.032606	0.081658	0.012948	1.279433
Soil concentration (µg/mL):	0.260788	0.037825	0.364313	3.1585	0.310583	0.03268	0.538448	3.106	0.289992	0.043152	0.352586	3.2148	0.287121	0.0378857	0.418449	3.1597667
Total µg in soil (µg):	12.045798	1.7471368	16.827617	145.89112	14.140844	1.4879204	24.515537	141.41618	13.380231	1.9910333	16.268318	148.33087	13.188958	1.7420301	19.203824	145.21272
Conc. in soil (µg/g):	1.7208282	0.249591	2.4039454	20.841588	2.0201206	0.2125601	3.5022196	20.202311	1.9114616	0.2844333	2.3240454	21.190125	1.8841368	0.2488614	2.7434035	20.744675
Rd calculation (mL/g):	53.010543	3.0262621	186.25129	16.141255	61.036365	2.6441107	288.6762	15.693554	59.255427	3.4641366	168.36029	16.820229	57.767445	3.0448364	214.42926	16.218346

Notes:

Solution weight = assume 1 g = 1 mL

$$\text{Rd calculation} = \frac{\text{mass of solute on the solid phase/unit mass of solid phase}}{\text{mass of solute in solution/unit volume of the liquid phase}}$$

Legend Technical Services, Inc.

Soil Adsorption Spreadsheet - ASTM D4319

Sample ID: **RS-21 (0901493-02)**

Time of Exposure: **192 hours**

Challenge Solution: **BB**

pH of Site Water: **7.80 (pre) / 7.70 (post)**

	A				B				C				Average			
Vial Weight (g):	9.47				9.47				9.47				9.47			
Soil Weight (g):	7				7				7				7			
Vial+Soil+Solution Weight (g):	61.1				61.2				60.8				61.03333333			
Solution Weight (g):	44.63				44.73				44.33				44.56333333			
pH of Solution (final)	7.3				7.29				7.33				7.306666667			
	As	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**
Solution Results (µg/mL):	0.008607	0.009712	0.025727	0.084759	0.008202	0.009604	0.021014	0.078707	0.006823	0.009433	0.023163	0.083761	0.0078773	0.009583	0.0233013	0.082409
Total µg added (µg):	0.3841304	0.4334466	1.148196	3.7827942	0.3668755	0.4295869	0.9399562	3.5205641	0.3024636	0.4181649	1.0268158	3.7131251	0.3511565	0.4270661	1.0383227	3.6721611
Solute analysis (µg/mL): *	0.00016	0.007012	0.006429	0.035511	0.00016	0.006127	0.007355	0.036273	0.001661	0.005138	0.00954	0.037265	0.000660	0.006092	0.007775	0.036350
Soil concentration (µg/mL):	0.008447	0.0027	0.019298	0.049248	0.008042	0.003477	0.013659	0.042434	0.005162	0.004295	0.013623	0.046496	0.007217	0.0034907	0.0155267	0.0460593
Total µg in soil (µg):	0.3769896	0.120501	0.8612697	2.1979382	0.3597187	0.1555262	0.6109671	1.8980728	0.2288315	0.1903974	0.6039076	2.0611677	0.3218466	0.1554749	0.6920481	2.0523929
Conc. in soil (µg/g):	0.0538557	0.0172144	0.1230385	0.3139912	0.0513884	0.022218	0.087281	0.2711533	0.0326902	0.0271996	0.0862725	0.2944525	0.0459781	0.0222107	0.098864	0.293199
Rd calculation (mL/g):	336.59787	2.4549955	19.138052	8.8420821	321.17738	3.6262494	11.866895	7.475347	19.681041	5.293815	9.0432403	7.9015839	225.81876	3.7916866	13.349396	8.0730043

Notes:

Solution weight = assume 1 g = 1 mL

** Values below MDL or negative if arsenic = 0.00016.*

$$\text{Rd calculation} = \frac{\text{mass of solute on the solid phase/unit mass of solid phase}}{\text{mass of solute in solution/unit volume of the liquid phase}}$$

Legend Technical Services, Inc.

Soil Adsorption Spreadsheet - ASTM D4319

Sample ID: **RS-21 (0901493-02)**

Time of Exposure: **192 hours**

Challenge Solution: **CC**

pH of Site Water: **7.84 (pre) / 7.46 (post)**

	A				B				C				Average			
Vial Weight (g):	9.55				9.55				9.55				9.55			
Soil Weight (g):	7				7				7				7			
Vial+Soil+Solution Weight (g):	62.02				61.8				61.25				61.69			
Solution Weight (g):	45.47				45.25				44.7				45.14			
pH of Solution (final)	7.33				7.3				7.35				7.326666667			
	As	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**
Solution Results (µg/mL):	0.021332	0.016669	0.081011	0.29269	0.020978	0.014981	0.081711	0.28344	0.023902	0.017064	0.095764	0.31983	0.0220707	0.016238	0.086162	0.2986533
Total µg added (µg):	0.969966	0.7579394	3.6835702	13.308614	0.9492545	0.6778903	3.6974228	12.82566	1.0684194	0.7627608	4.2806508	14.296401	0.99588	0.7328635	3.8872146	13.476892
Solute analysis (µg/mL): *	0.00016	0.008788	0.005665	0.059104	0.00016	0.009169	0.005069	0.059986	0.00016	0.009263	0.005643	0.068444	0.000160	0.009073	0.005459	0.062511
Soil concentration (µg/mL):	0.021172	0.007881	0.075346	0.233586	0.020818	0.005812	0.076642	0.223454	0.023742	0.007801	0.090121	0.251386	0.0219107	0.0071647	0.080703	0.236142
Total µg in soil (µg):	0.9626908	0.3583491	3.4259826	10.621155	0.9420145	0.262993	3.4680505	10.111294	1.0612674	0.3487047	4.0284087	11.236954	0.9886576	0.3233489	3.6408139	10.656468
Conc. in soil (µg/g):	0.1375273	0.0511927	0.4894261	1.5173079	0.1345735	0.0375704	0.4954358	1.4444705	0.1516096	0.049815	0.575487	1.6052792	0.1412368	0.0461927	0.5201163	1.5223525
Rd calculation (mL/g):	859.54539	5.8252986	86.39472	25.671831	841.08438	4.0975492	97.738368	24.080127	947.56018	5.3778427	101.98245	23.453906	882.72998	5.1002302	95.371845	24.401955

Notes:

Solution weight = assume 1 g = 1 mL

** Values below MDL or negative if arsenic = 0.00016.*

$$\text{Rd calculation} = \frac{\text{mass of solute on the solid phase/unit mass of solid phase}}{\text{mass of solute in solution/unit volume of the liquid phase}}$$

Legend Technical Services, Inc.

Soil Adsorption Spreadsheet - ASTM D4319

Sample ID: **RS-21 (0901493-02)**

Time of Exposure: **192 hours**

Challenge Solution: **DD**

pH of Site Water: **7.81 (pre) / 7.20 (post)**

	A				B				C				Average			
Vial Weight (g):	9.47				9.47				9.46				9.466666667			
Soil Weight (g):	7				7.01				7.07				7.026666667			
Vial+Soil+Solution Weight (g):	60.14				59.92				60.99				60.35			
Solution Weight (g):	43.67				43.44				44.46				43.85666667			
pH of Solution (final)	7.04				7.12				7.05				7.07			
	As	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**
Solution Results (µg/mL):	0.044614	0.02755	0.16404	0.52088	0.053043	0.03206	0.18388	0.58427	0.051238	0.029739	0.17825	0.56809	0.0496317	0.029783	0.17539	0.5577467
Total µg added (µg):	1.9482934	1.2031085	7.1636268	22.74683	2.3041879	1.3926864	7.9877472	25.380689	2.2780415	1.3221959	7.924995	25.257281	2.1768409	1.3059969	7.692123	24.4616
Solute analysis (µg/mL): *	0.00016	0.013064	0.006029	0.16221	0.00016	0.014251	0.006435	0.162	0.00016	0.018976	0.007186	0.1999	0.000160	0.015430	0.006550	0.174703
Soil concentration (µg/mL):	0.044454	0.014486	0.158011	0.35867	0.052883	0.017809	0.177445	0.42227	0.051078	0.010763	0.171064	0.36819	0.0494717	0.0143527	0.16884	0.3830433
Total µg in soil (µg):	1.9413062	0.6326036	6.9003404	15.663119	2.2972375	0.773623	7.7082108	18.343409	2.2709279	0.478523	7.6055054	16.369727	2.1698239	0.6282499	7.4046855	16.792085
Conc. in soil (µg/g):	0.2773295	0.0903719	0.9857629	2.2375884	0.3277086	0.1103599	1.0996021	2.6167488	0.3212062	0.0676836	1.0757433	2.3153787	0.3087481	0.0894718	1.0537028	2.3899053
Rd calculation (mL/g):	1733.3091	6.9176321	163.50355	13.794393	2048.179	7.7440116	170.87834	16.15277	2007.5388	3.5667996	149.69988	11.582685	1929.6756	6.0761478	161.36059	13.843282

Notes:

Solution weight = assume 1 g = 1 mL

** Values below MDL or negative if arsenic = 0.00016.*

$$\text{Rd calculation} = \frac{\text{mass of solute on the solid phase/unit mass of solid phase}}{\text{mass of solute in solution/unit volume of the liquid phase}}$$

Legend Technical Services, Inc.

Soil Adsorption Spreadsheet - ASTM D4319

Sample ID: **RS-21 (0901493-02)**

Time of Exposure: **192 hours**

Challenge Solution: **EE**

pH of Site Water: **7.82 (pre) / 6.89 (post)**

	A				B				C				Average			
Vial Weight (g):	9.47				9.47				9.55				9.496666667			
Soil Weight (g):	7				7				7				7			
Vial+Soil+Solution Weight (g):	61.89				61.56				61.24				61.56333333			
Solution Weight (g):	45.42				45.09				44.69				45.06666667			
pH of Solution (final)	7.24				7.2				7.23				7.223333333			
	As	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**	**As**	**Sb**	**Cu**	**Ni**
Solution Results (µg/mL):	0.20264	0.088632	0.2384	3.3254	0.19672	0.097153	0.23072	3.7325	0.30422	0.099592	0.30888	3.8377	0.2345267	0.0951257	0.2593333	3.6318667
Total µg added (µg):	9.2039088	4.0256654	10.828128	151.03967	8.8701048	4.3806288	10.403165	168.29843	13.595592	4.4507665	13.803847	171.50681	10.556535	4.2856869	11.67838	163.61497
Solute analysis (µg/mL):	0.012119	0.057648	0.010235	0.97679	0.026089	0.057772	0.009882	1.0454	0.026801	0.062541	0.01016	1.0586	0.021670	0.059320	0.010092	1.026930
Soil concentration (µg/mL):	0.190521	0.030984	0.228165	2.34861	0.170631	0.039381	0.220838	2.6871	0.277419	0.037051	0.29872	2.7791	0.212857	0.0358053	0.249241	2.6049367
Total µg in soil (µg):	8.6534638	1.4072933	10.363254	106.67387	7.6937518	1.7756893	9.9575854	121.16134	12.397855	1.6558092	13.349797	124.19798	9.5816902	1.6129306	11.223546	117.34439
Conc. in soil (µg/g):	1.2362091	0.2010419	1.4804649	15.239124	1.0991074	0.2536699	1.4225122	17.308763	1.7711222	0.2365442	1.9071138	17.742568	1.3688129	0.2304187	1.6033636	16.763485
Rd calculation (mL/g):	102.00587	3.4874045	144.64728	15.601228	42.12915	4.3908796	143.94983	16.557072	66.084182	3.7822256	187.70805	16.760408	70.073067	3.8868366	158.76839	16.306236

Notes:

Solution weight = assume 1 g = 1 mL

$$\textit{Rd calculation} = \frac{\textit{mass of solute on the solid phase/unit mass of solid phase}}{\textit{mass of solute in solution/unit volume of the liquid phase}}$$