Sampling Focus Group Follow Up Emails

From Brandee Era-Miller

6/19/2014 1:30 pm

Bud,

You are correct in that your data only shows a weak positive correlation between TSS and Percent reduction ($R^2 = 0.25$). Perhaps flux rate does matter. Now, I really think we need a controlled laboratory study to better figure this out!

Thanks,

Brandee

From: Leber, Bud [mailto:Bud.Leber@kaisertwd.com]

Sent: Tuesday, June 17, 2014 12:00 PM

To: Era-Miller, Brandee (ECY); <u>c.page@wsu.edu</u>

Cc: Borgias, Adriane P. (ECY); Fernandez, Arianne (ECY); Lindsay, Robert (DOHi); Kris Holm;

DONKEIL@cdaid.org; Cathy Whiting; Hobbs, William (ECY)

Subject: RE: CLAM Meeting Follow-up Question

Brandee,

Here is the <u>data summary</u> that I put together that has all six samples from our testing that shows TSS and flow reduction. I don't see any correlation. In some discussions with GeoEngineers one thought was that maybe the flux rate (liter per minute per square inch of media surface makes a difference. This would translate into smaller sample volumes because of a lower sampling rate. The only confounding thing is that on tap water we only saw a 12%. I don't have TSS data for that sample, but it has got to be something like 1 mg/l which is where some of the data points were.

Bud

CLAM Summary Data

	Initial Flow	Final Flow	Percent	Duration	TSS	0&G
TOF Inlet	(liters/min)	(liters/min)	Reduction	(min)	(mg/L)	(mg/L)
10/02/13	52	14	73%	1,440	5.5	2.3
10/03/13	58	0	100%	1,440	10.6	2.1
10/04/13	60	4	93%	1,440	4.2	1.3
Outfall 001						
10/02/13	76	10	87%	1,440	7.4	1.0
10/03/13	62	26	58%	1,450	2.8	0.8
10/04/13	66	6	91%	1,440	2.1	0.8
Tap Water						
10/13/13	59.9	52.8	12%	1,439		

From: Era-Miller, Brandee (ECY) [mailto:BERA461@ECY.WA.GOV]

Sent: Monday, June 16, 2014 2:18 PM

To: Leber, Bud; <u>c.page@wsu.edu</u>

Cc: Borgias, Adriane P. (ECY); Fernandez, Arianne (ECY); Lindsay, Robert (DOHi); Kris Holm;

DONKEIL@cdaid.org; Cathy Whiting; Hobbs, William (ECY)

Subject: RE: CLAM Meeting Follow-up Question

Bud,

TSS concentrations from the Spokane River during our study ranged from not detected at the reporting limit of 1 mg/L (U) to 4 mg/L. See the highlighted results in the table below that show where and when we took CLAM samples along with the grab samples. At 1 mg/L (U) TSS, our initial pumping rate went down 30% in 24 hours and at 4 mg/L it went down 70% in 24 hours. The loss in pumping rate is likely an indication of the SPE filter clogging as we discussed earlier. I'm wondering that with such large sample volumes filtered with the CLAM, if even low levels of TSS (or other particulates) could make a difference? I'm curious to see what Geo and AXYS think.

Dates	10/24/13 - 10/25/13									
Location	Stateline	Upriver Dam	Above Latah	Ninemile	Ninemile Rep	Chamokane				
Sample No.	1210040-01	1210040-02	1210040-03	1210040-04	1210040-06	1210040-05				
TSS	1	1 U	1 U	4	4	1 U				
	5/23/13 - 5/24/13									
Dates			5/23/13 -	5/24/13						
Dates Location	Stateline	Upriver Dam	5/23/13 - Above Latah	5/24/13 Latah Rep	Ninemile	Chamokane				
Dates Location Sample No.	Stateline 1305006-01	Upriver Dam 1305006-02	5/23/13 - Above Latah 1305006-03	5/24/13 Latah Rep 1305006-06	Ninemile 1305006-04	Chamokane 1305006-05				

Thanks for the taking time to research this.

--Brandee

From: Leber, Bud [mailto:Bud.Leber@kaisertwd.com]

Sent: Monday, June 16, 2014 9:05 AM

To: Era-Miller, Brandee (ECY); c.page@wsu.edu

Cc: Borgias, Adriane P. (ECY); Fernandez, Arianne (ECY); Lindsay, Robert (DOHi); Kris Holm;

DONKEIL@cdaid.org; Cathy Whiting; Hobbs, William (ECY)

Subject: RE: CLAM Meeting Follow-up Question

Brandee,

I have not yet talked with GeoEngineers or AXYS yet, but I grabbed some samples of our water from two locations. The sampling location for the composite samples and CLAM was out our final discharge point which is just downstream of our walnut shell filtration system. As a result, TSS levels are rarely over 2 mg/L. Attached are pictures of a grab sample at the point of discharge from the filter (first two pictures) and at the point where samples for the 24-hour composite and CLAM were collected (second two pictures). I'll check with Geo and AXYS when I get a chance, but I don't think particulate phase adsorption for this location would explain the difference.

Bud

From: Era-Miller, Brandee (ECY) [mailto:BERA461@ECY.WA.GOV]
Sent: Wednesday, June 11, 2014 10:53 AM
To: Leber, Bud; c.page@wsu.edu
Cc: Borgias, Adriane P. (ECY); Fernandez, Arianne (ECY); Lindsay, Robert (DOHi); Kris Holm;
DONKEIL@cdaid.org; Cathy Whiting; Hobbs, William (ECY)
Subject: RE: CLAM Meeting Follow-up Question
Hi,

I talked to John Weakland (from Manchester Lab's Organics group) about why there might have been a difference in concentration between the composite samples and the CLAM samples (results calculated with actual measured volume) in the study conducted at Kaiser by GeoEngineers.

Liquid/liquid extraction should be comparable to extraction using an SPE disk, however it depends on how the liquid/liquid extraction was conducted. Some labs will let particulates settle out in a sample bottle and then decant water off the top into the extraction device (like a Soxhlet for example). Some labs will rinse out the sample bottle to make sure they get all the particulates out of the bottle into the extraction device. PCBs are non-polar and have an affinity for particulates. So, my question is were the particulates for the composite sampling included in the entire process from collection, processing, to analysis? CLAMs (via SPE disks) are very efficient at entraining particulates and if PCBs are hanging out in those sediments then we might get higher concentrations with the CLAM.

Bud, maybe you could run this by GeoEngineers and AXYS? Food for thought.

Thanks, Brandee From: Leber, Bud [mailto:Bud.Leber@kaisertwd.com] Sent: Friday, June 06, 2014 1:05 PM To: c.page@wsu.edu Cc: Borgias, Adriane P. (ECY); Fernandez, Arianne (ECY); Era-Miller, Brandee (ECY); Lindsay, Robert (DOHi); Kris Holm; DONKEIL@cdaid.org; Cathy Whiting Subject: CLAM Meeting Follow-up Question

I agreed to follow-up with AXYS on the question of how the 24 hour composite samples for our study were extracted for analysis. For the water samples a liquid/liquid extraction is performed using dichloromethane. The discs are extracted with methanol and dichloromethane. Bud

Bernard P (Bud) Leber, Jr Kaiser Aluminum Trentwood