Message

From: Jennings, Eleanor [Eleanor.Jennings@parsons.com]
Sent: 5/13/2019 10:53:02 PM
To: D'Almeida, Carolyn [dAlmeida.Carolyn@epa.gov]; 'Wayne Miller' [Miller.Wayne@azdeq.gov]
CC: d p [DPope@css-dynamac.com]; Davis, Eva [Davis.Eva@epa.gov]; Nicole Goers [Nicole.Goers@TechLawInc.com]; 'Brasaemle, Karla' [KBrasaemle@TechLawInc.com]; 'Rohrbaugh, Amanda' [ARohrbaugh@TechLawInc.com]; 'Bo Stewart' [bo@praxis-enviro.com]; William Hughes [William.Hughes@cn-bus.com]; 'steve@uxopro.com' [steve@uxopro.com]; 'Panzino.Paula@azdeq.gov' [Panzino.Paula@azdeq.gov]
Subject: RE: ST012 Site Activities
Attachments: ATT00001.txt

Sensitive / Proprietary

Sorry for the delayed response ... storms took out phone and internet for the day. The storms weren't bad, but the ground is so saturated that the soils allowed a tree to fall and hit some overhead lines.

Yeah, I noticed that they had frowny faces for a high population. My guess is that this is because the test was developed initially for use in the fracking industry, where high levels of SRBs are bad. But yes, for our site, we WANT high levels of SRBs, so we would "turn that frown upside down" as it were, and be happy with high numbers!

Regardless, frowny faces and smiley faces are not the qualitative population measurements promised. ☺

Eleanor M. Jennings, M.S., PhD
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"Safety Isn't Expensive. It's Priceless."

From: D'Almeida, Carolyn <dAlmeida.Carolyn@epa.gov>
Sent: Monday, May 13, 2019 12:12 PM
To: Jennings, Eleanor <Eleanor.Jennings@parsons.com>; 'Wayne Miller' <Miller.Wayne@azdeq.gov>
Cc: d p <DPope@css-dynamac.com>; Davis, Eva <Davis.Eva@epa.gov>; Nicole Goers <Nicole.Goers@TechLawInc.com>; 'Brasaemle, Karla' <KBrasaemle@TechLawInc.com>; 'Rohrbaugh, Amanda' <ARohrbaugh@TechLawInc.com>; 'Bo Stewart' <bo@praxis-enviro.com>; William Hughes <William.Hughes@cn-bus.com>; 'steve@uxopro.com' <steve@uxopro.com>; 'Panzino.Paula@azdeq.gov' <Panzino.Paula@azdeq.gov>
Subject: RE: ST012 Site Activities

With the use of smiles and frowns as population indicators, I see what you mean about not being quantitative. But in our case, shouldn't the smiles and frowns be reversed?

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"We can evade reality, but we cannot evade the consequences of evading reality." - Ayn Rand

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From: Jennings, Eleanor <Eleanor.Jennings@parsons.com>
Sent: Friday, May 10, 2019 3:44 PM
To: D'Almeida, Carolyn <dAlmeida.Carolyn@epa.gov>; 'Wayne Miller' <Miller.Wayne@azdeq.gov>
Cc: d p <DPope@css-dynamac.com>; Davis, Eva <Davis.Eva@epa.gov>; Nicole Goers <Nicole.Goers@TechLawInc.com>; 'Brasaemle, Karla' <KBrasaemle@TechLawInc.com>; 'Rohrbaugh, Amanda' <ARohrbaugh@TechLawInc.com>; 'Bo Stewart' <bo@praxis-enviro.com>; William Hughes <William.Hughes@cn-bus.com>; 'steve@uxopro.com' <steve@uxopro.com>; 'Panzino.Paula@azdeq.gov' <Panzino.Paula@azdeq.gov>
Subject: RE: ST012 Site Activities

Sensitive / Proprietary

Hello, All
There have been some questions about the SRB-BART tests mentioned in Don Smallbeck's below email, and so here's a fast run-down on things.

What they are:
The SRB-BART tests are field-based samplers capable of testing for the presence of specific bacterial types. The type of bacteria targeted is dependent on the type of medium used in each vial. In this case, the samplers are designed to test for sulfate-reducing bacteria (SRBs). See the attached pamphlets for images. The SRB-BART tests are based on two things:

- The colorimetric change that occurs as the SRBs produce hydrogen sulfide, which can react to form the ink-black iron sulfide, and
- The time needed to produce a visible, hydrogen-sulfide based colorimetric change in the vial is indirectly proportional to the SRB population size (in other words, a bigger population causes a faster color change).

A measured amount of groundwater is added to each vial, and the SRB population that is indigenous to the groundwater will trigger this colorimetric reaction.

What these tests are good at, and what information they can provide at Williams AFB, ST012:
These analyses are a "quick and dirty" way to determine if a targeted water source has SRBs in it, and if that SRB population can be qualitatively described as small, medium, or large in size. No special microbial training is needed for these analyses, nor is any special equipment. The tests are set up, maintained at room temperature, and checked every 24 hours for up to 15 days. Results are qualitative, not quantitative.

At ST012, these tests would make a very good, qualitative way to monitor if an SRB population is increasing. Again, it's easy and inexpensive. It would therefore make a very good monitoring system to determine when

to perform the more rigorous, quantitative qPCR analyses promised in the RAWP Table 5-1 and the Decision Matrix.

What the tests don't do:
These SRB-BART tests are not quantitative. At the very best, environmental samples can be tested to determine if SRBs are present, and if they are, the population size can be scored as low, medium, or high.

Although the test paperwork for these analyses suggest that an actual population size can be estimated based on the time it takes for the colorimetric reaction to occur, this is not true. A call to the manufacturer confirmed that this data was based on pre-dosed, laboratory cultures. For environmental samples, order of magnitude differences at best can be qualitatively compared. As such, the manufacturer does not recommend that these tests be used to quantify an environmental bacterial population.

Because the SRB-BART tests are qualitative, they are not a substitution for the qPCR analyses (for SRBs) specifically promised in the RAWP-Addendum Table 5-1 and in the Decision Matrix.

In addition, the qualitative nature of the SRB-BART data means that there is no direct way to compare SRB-BART results to the data obtained through the previously-conducted, highly quantitative Microbial Insights Quant-Array analysis that was performed in 2018. At best, the quantitative Quant-Array data could be viewed in qualitative terms (low, medium, or high population sizes), which can be qualitatively compared to the SRB-BART data. However, even this is subjective because the SRB-BART test is based on a personal judgement call on when a colorimetric medium change occurs.

Hope this helps, and let me know if there are any questions or if you would like additional information.
Have a good, and safe, weekend,
E

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"Safety Isn't Expensive. It's Priceless."

From: D'Almeida, Carolyn <dAlmeida.Carolyn@epa.gov>
Sent: Thursday, May 09, 2019 2:44 PM
To: Smallbeck, Donald R. <donald.smallbeck@woodplc.com>; 'JERRARD, CATHERINE V CIV USAF HAF AFCEC/CIBW' <catherine.jerrard@us.af.mil>; 'Wayne Miller' <Miller.Wayne@azdeq.gov>; Pearson, Stuart C. <stuart.pearson@woodplc.com>
Cc: d p <DPope@css-dynamac.com>; Davis, Eva <Davis.Eva@epa.gov>; GANGNUSS, GREGORY G GS-14 USAF HAF AFCEC/CIBP <gregory.gangnuss@us.af.mil>; Nicole Goers <Nicole.Goers@TechLawInc.com>; 'Brasaemle, Karla' <KBrasaemle@TechLawInc.com>; 'Rohrbaugh, Amanda' <ARohrbaugh@TechLawInc.com>; 'Bo Stewart' <bo@praxis-enviro.com>; William Hughes <William.Hughes@cn-bus.com>; 'steve@uxopro.com' <steve@uxopro.com>; Jennings, Eleanor <Eleanor.Jennings@parsons.com>; 'Panzino.Paula@azdeq.gov' <Panzino.Paula@azdeq.gov>
Subject: RE: ST012 Site Activities

Thank you Don.

Are you planning to collect baseline and periodic monitoring data using the screening kits, or will that be done with the MI QuantArray lab test you did before? What is the planned schedule/frequency of microbial sampling?

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From: Smallbeck, Donald R. <donald.smallbeck@woodplc.com>
Sent: Thursday, May 9, 2019 11:34 AM
To: D'Almeida, Carolyn <dAlmeida.Carolyn@epa.gov>; 'JERRARD, CATHERINE V CIV USAF HAF AFCEC/CIBW' <catherine.jerrard@us.af.mil>; 'Wayne Miller' <Miller.Wayne@azdeq.gov>; Pearson, Stuart C. <stuart.pearson@woodplc.com>
Cc: d p <DPope@css-dynamac.com>; Davis, Eva <Davis.Eva@epa.gov>; GANGNUSS, GREGORY G GS-14 USAF HAF AFCEC/CIBP <gregory.gangnuss@us.af.mil>; Nicole Goers <Nicole.Goers@TechLawInc.com>; 'Brasaemle, Karla' <KBrasaemle@TechLawInc.com>; 'Rohrbaugh, Amanda' <ARohrbaugh@TechLawInc.com>; 'Bo Stewart' <bo@praxis-enviro.com>; William Hughes <William.Hughes@cn-bus.com>; 'steve@uxopro.com' <steve@uxopro.com>; 'Jennings, Eleanor' <Eleanor.Jennings@parsons.com>; 'Panzino.Paula@azdeq.gov' <Panzino.Paula@azdeq.gov>
Subject: RE: ST012 Site Activities

Please find attached the field test screening information.

The results to date are

UWBZ27 1.15×10^5 cfu/ml

LSZ39 325 to 1400 cfu/ml

cfu=colony forming units

From: D'Almeida, Carolyn <dAlmeida.Carolyn@epa.gov>
Sent: Thursday, May 09, 2019 10:47 AM
To: Smallbeck, Donald R. <donald.smallbeck@woodplc.com>; 'JERRARD, CATHERINE V CIV USAF HAF AFCEC/CIBW' <catherine.jerrard@us.af.mil>; 'Wayne Miller' <Miller.Wayne@azdeq.gov>; Pearson, Stuart C. <stuart.pearson@woodplc.com>
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Subject: RE: ST012 Site Activities

Thanks Don

Can you tell us what the name/manufacturer of field test kit you are using for sulfate reducers, and compilation of data you have so far for each of the wells?

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From: Smallbeck, Donald R. <donald.smallbeck@woodplc.com>
Sent: Wednesday, May 8, 2019 2:07 PM
To: D'Almeida, Carolyn <dAlmeida.Carolyn@epa.gov>; 'JERRARD, CATHERINE V CIV USAF HAF AFCEC/CIBW' <catherine.jerrard@us.af.mil>; 'Wayne Miller' <Miller.Wayne@azdeq.gov>; Pearson, Stuart C. <stuart.pearson@woodplc.com>
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Subject: RE: ST012 Site Activities

Carolyn

It is a field screening test kit performed by Wood personnel which has been described in previous BCT presentations. There is no specific report other than the test kit results. I will provide the information associated with the kits in a separate email.

From: D'Almeida, Carolyn <dAlmeida.Carolyn@epa.gov>
Sent: Wednesday, May 08, 2019 2:03 PM
To: Smallbeck, Donald R. <donald.smallbeck@woodplc.com>; 'JERRARD, CATHERINE V CIV USAF HAF AFCEC/CIBW' <catherine.jerrard@us.af.mil>; 'Wayne Miller' <Miller.Wayne@azdeq.gov>; Pearson, Stuart C. <stuart.pearson@woodplc.com>
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Subject: RE: ST012 Site Activities

Can we get the field screening data reports indicating presence of sulfate reducers referenced below?
Thank you.

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From: Smallbeck, Donald R. <donald.smallbeck@woodplc.com>
Sent: Wednesday, May 8, 2019 1:47 PM
To: 'JERRARD, CATHERINE V CIV USAF HAF AFCEC/CIBW' <catherine.jerrard@us.af.mil>; 'Wayne Miller' <Miller.Wayne@azdeq.gov>; D'Almeida, Carolyn <dAlmeida.Carolyn@epa.gov>; Pearson, Stuart C. <stuart.pearson@woodplc.com>
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Subject: ST012 Site Activities

Activities through last week (5/03)

- SVE Operation
- LNAPL checks
- CZ21 repaired with new motor
- Continued extraction and treatment ~50 gpm, ~17.5 million total gallons treated since startup of EBR extraction.
- Operating Extraction Wells: CZ07, CZ21, UWBZ21, UWBZ26, UWBZ27, UWBZ30, LSZ09, LSZ11, LSZ12, LSZ23, LSZ37, LSZ38, LSZ39
- Extraction Wells Down: CZ18, UWBZ22
- CZ07 pumping at approximately 14 gpm.
- Started quarterly GW sampling (except for extraction wells still to be repaired)
- Injections:
    - UWBZ35: 3 tons 4/8, ~1 ton 4/9, 0.7 tons 4/10, 2.7 tons 4/12
    - LSZ08: 2 tons 4/9, 1.3 tons 4/10, 2.3 tons 4/12, 3 tons 4/17, 5 tons 4/18, 2.6 tons 4/25
    - LSZ47: 0.4 tons 4/25, 3 tons 4/26, 4.3 tons 4/29,
    - LSZ48: 5 tons 4/30, 2.5 tons 5/1
    - LSZ49: 3.5 tons 5/1, 2 tons 5/3
- Sulfate screening at LZS39 indicates that the sulfate concentration has achieved breakthrough, is in a range for EBR to commence, (approximately 1,000 mg/L and extraction was stopped on May 2 for aquifer re-equilibration. Field screening (semi-quantitative) of sulfate reducers after pumping was stopped (approximately 7 days) indicated a low level population is present. Approximately 10-14 days after extraction ceases, a Time 0 groundwater sample will be collected to establish a VOCs and inorganic parameter profile.
- Sulfate screening at UWBZ27 indicates that sulfate concentration has achieved breakthrough, is in range for EBR to commence, (approximately 1,000 mg/L and extraction was stopped on May 2 for aquifer re-equilibration. Field screening (semi-quantitative) of sulfate reducers after pumping had stopped (approximately 7 days) indicated a robust population of approximately $1x10^5$ is present. Approximately 10-14 days after extraction ceases, a Time 0 groundwater sample will be collected to establish a VOCs and inorganic parameter profile.

This week (5/6-5/10)

- SVE Operation
- Continue extraction
- LNAPL checks
- CZ07 repair (went down 5/7, repair scheduled 5/9)
- Continue quarterly GW sampling

- Continue injecting sulfate

Next Week (5/13-5/17)

- SVE Operation
- LNAPL checks
- Continue extraction
- Repair CZ18 and UWBZ22
- Continue Injecting sulfate
- Time 0 sampling at LSZ39 and UWBZ27

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