Message

From: d'Almeida, Carolyn K. [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=9EC4401AFA1846DD93D52A0DDA973581-CDALMEID]
Sent: 6/23/2017 4:46:57 PM
To: Dan Pope [DPope@css-inc.com]; Jennings, Eleanor [Eleanor.Jennings@parsons.com]; Bo Stewart [Bo@praxis-enviro.com]; Cosler, Doug [Doug.Cosler@TechLawInc.com]; Davis, Eva [Davis.Eva@epa.gov]; Wayne Miller [Miller.Wayne@azdeq.gov]; Steve Willis [steve@uxopro.com]
CC: Brasaemle, Karla [Karla.Brasaemle@TechLawInc.com]
Subject: RE: Williams - ST012 - Period ending 5/12 report

I think we're just trying to understand what is happening to refine the CSM

Carolyn d'Almeida
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"Because a waste is a terrible thing to mind..."

From: Dan Pope [mailto:DPope@css-inc.com]
Sent: Friday, June 23, 2017 6:18 AM
To: Jennings, Eleanor <Eleanor.Jennings@parsons.com>; Bo Stewart <Bo@praxis-enviro.com>; Cosler, Doug <Doug.Cosler@TechLawInc.com>; d'Almeida, Carolyn K. <dAlmeida.Carolyn@epa.gov>; Davis, Eva <Davis.Eva@epa.gov>; Wayne Miller <Miller.Wayne@azdeq.gov>; Steve Willis <steve@uxopro.com>
Cc: Brasaemle, Karla <Karla.Brasaemle@TechLawInc.com>
Subject: RE: Williams - ST012 - Period ending 5/12 report

What do we hope to achieve by confronting AF/AMEC with all our discussions/speculations about methane? That is, what are our goals, our tactics to achieve those goals, and our overall strategy?

From: Jennings, Eleanor [mailto:Eleanor.Jennings@parsons.com]
Sent: Friday, June 23, 2017 8:14 AM
To: Bo Stewart; Cosler, Doug; 'd'Almeida, Carolyn K.'; Davis, Eva; Dan Pope; Wayne Miller; Steve Willis
Cc: Brasaemle, Karla
Subject: RE: Williams - ST012 - Period ending 5/12 report

See my responses below.....

Happy Friday, everyone!!
E

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

From: Bo Stewart [mailto:Bo@praxis-enviro.com]
Sent: Thursday, June 22, 2017 8:03 PM
To: Jennings, Eleanor <Eleanor.Jennings@parsons.com>; Cosler, Doug <Doug.Cosler@TechLawInc.com>; 'd'Almeida, Carolyn K.' <dAlmeida.Carolyn@epa.gov>; Davis, Eva <Davis.Eva@epa.gov>; Dan Pope <DPope@css-inc.com>; Wayne Miller <Miller.Wayne@azdeq.gov>; Steve Willis <steve@uxopro.com>
Cc: Brasaemle, Karla <Karla.Brasaemle@TechLawInc.com>
Subject: Re: Williams - ST012 - Period ending 5/12 report

Hold on ... we are getting into new areas of the site and need to include hydrocarbon mass and location in the equation. We have a big vadose zone with varying residual NAPL in different horizons with different mechanisms of degradation. Aerobic might be going at a much higher rate but on a smaller mass of hydrocarbon (where no methanogenesis occurs) in the middle vadose zone whereas methanogenesis occurs at a slower rate on a much larger mass of hydrocarbon in the deep vadose zone.

EMJ: OK, so although aerobic biodeg still works faster on X amount of hydrocarbon, the net amount of anaerobic/methanogenic biodegradation occurring is higher because of the higher amounts of hydrocarbons being biodegraded in the anaerobic zone as opposed to the aerobic zone. I get that, as long as the models support it. Thanks, Bo, for talking this microbiologist off of a ledge!

In addition, the residual NAPL in the middle vadose zone is at least partially tied up in finer grained, moist soils where oxygen is depleted faster than it can diffuse into this matrix. These views are consistent with the conceptual site model. Heat may not reach portions of the site undergoing aerobic degradation and therefore have no impact. The opposite for anaerobic. I've observed this following heating at several hydrocarbon sites.

Methanogensis is increased on the fringes of the steam zone and where heat is conducted (upward in particular) rather than in the steam zone.

EMJ: This makes sense. On the fringes, it's warmer (but not too hot) and thus the methanogens have an increased metabolic rate. In the steam zone, though, it's too hot for the methanogens to live. Again, I can buy that.

It decays when steam is ceased and energy is being extracted (pulled away from previously heated zones). Also, if the water table is allowed to rise it saturates degrading hydrocarbon above and slows transport to and from this hydrocarbon. After the pilot test, the site was actively cooled by water injection and continued SVE tended to cool the deep vadose zone mitigating the enhancement to degradation.

Just a thought: I think we need to be kind of careful, though, when talking about methane. There is a big difference between active, currently-ongoing bacterial methane production (methanogenesis) and methane detection when you're out in the environment. A spike in detected methane could just mean that a pocket of long-ago-generate methane was dislodged (mechanically, or through treatments that include steam). It doesn't necessarily mean that there was a spike in current bacterial methanogenesis. This is one (of many) reasons why I like Bo's models – he was able to control "site" conditions, to account for these types of variables. If AMEC is going to use methane detection as an equivalent to current anaerobic methane generation, and then take it a step further to use methane detection as an equivalent to active, current sulfate-reduction potential (which I think they are doing), this makes the microbial-monitoring metrics in our checklist even more critical. Again, just my two cents.

On 6/22/2017 4:25 PM, Jennings, Eleanor wrote:

So hydrocarbon-degradation rates jumped up 300% during methanogenic conditions as opposed to aerobic conditions? Ummmm..... that goes against pretty much everything in the biodegradation literature. I'm assuming that this methanogenic "degradation" includes thermal breakdown?

-E

Still working on my other email (I'm trying to eat dinner at the same time, and it's not working out well....). ☺

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

From: Bo Stewart [mailto:Bo@praxis-enviro.com]
Sent: Thursday, June 22, 2017 7:20 PM
To: Jennings, Eleanor <Eleanor.Jennings@parsons.com>; Cosler, Doug <Doug.Cosler@TechLawInc.com>; 'd'Almeida, Carolyn K.' <dAlmeida.Carolyn@epa.gov>; Davis, Eva <Davis.Eva@epa.gov>; Dan Pope <DPope@css-inc.com>; Wayne Miller <Miller.Wayne@azdeq.gov>; Steve Willis <steve@uxopro.com>
Cc: Brasaemle, Karla <Karla.Brasaemle@TechLawInc.com>
Subject: Re: Williams - ST012 - Period ending 5/12 report

Here are the similarly calculated rates of degradation from SVE operations starting in 2005 and through the TEE pilot test from manifold data. The SVE manifold is a mix of extraction wells including the middle vadose zone (likely aerobic) and the deep vadose zone (very likely anaerobic). Measures from individual extraction wells are available to sort out where the degradation was occurring. A similar decay in methanogenesis was observed after steam injection ceased.

To Doug's point, I refrained from going into the aqueous diffusion rate of methane compared to the vadose zone during the call. Didn't see a point in continuing to "disagree with everything." I don't think I disagree with everything -- I think people disagree with me. I agree with field data.

On 6/22/2017 3:59 PM, Jennings, Eleanor wrote:

Yeah, but you made a point .... if they drew in that much O2, the subsurface would NOT be anaerobic, and certainly not to the degree to support sulfate-reducers or methanogens. Aerobic and methanogenesis are at polar-opposite ends of the redox spectrum.

E

PS: I'm working on an email response to the whole "we have methane - yeah!" issue as well as temperature. Hold on while I finish it up.....

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

-----Original Message-----
From: Cosler, Doug [mailto:Doug.Cosler@TechLawInc.com]
Sent: Thursday, June 22, 2017 6:56 PM
To: 'd'Almeida, Carolyn K.' <dAlmeida.Carolyn@epa.gov>; Davis, Eva <Davis.Eva@epa.gov>; Dan Pope <DPope@css-inc.com>; Wayne Miller <Miller.Wayne@azdeq.gov>; Jennings, Eleanor

<Eleanor.Jennings@parsons.com>; Steve Willis <steve@uxopro.com>; Bo Stewart <Bo@Praxis-Enviro.com>
Cc: Brasaemle, Karla <Karla.Brasaemle@TechLawInc.com>
Subject: RE: Williams - ST012 - Period ending 5/12 report

Discard what I said about aerobic bio, as they estimated bio due to methanogenesis.

-----Original Message-----

From: d'Almeida, Carolyn K. [mailto:dAlmeida.Carolyn@epa.gov]

Sent: Thursday, June 22, 2017 6:00 PM

To: Davis, Eva <Davis.Eva@epa.gov>; Dan Pope <DPope@css-inc.com>; Wayne Miller <Miller.Wayne@azdeq.gov>; Jennings, Eleanor <Eleanor.Jennings@parsons.com>; Steve Willis <steve@uxopro.com>; Bo Stewart <Bo@Praxis-Enviro.com>

Cc: Cosler, Doug <Doug.Cosler@TechLawInc.com>; Brasaemle, Karla <Karla.Brasaemle@TechLawInc.com>

Subject: RE: Williams - ST012 - Period ending 5/12 report

That's why the made the effort today to demonstrate how much methane they are pulling out as evidence that biodegradation is occurring. But I still think the key question is why is the trend in methane production declining from initial record right after SVE startup. Does this represent methane production from decades of biodegradation before SEE which they just now recovered, and is tapering off as it is extracted, and maybe does not reflect current biological conditions?

Carolyn d'Almeida

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"Because a waste is a terrible thing to mind…"

-----Original Message-----

From: Davis, Eva

Sent: Thursday, June 22, 2017 2:31 PM

To: Dan Pope <DPope@css-inc.com>; d'Almeida, Carolyn K. <dAlmeida.Carolyn@epa.gov>; Wayne Miller

<Miller.Wayne@azdeq.gov>; Jennings, Eleanor <Eleanor.Jennings@parsons.com>; Steve Willis <steve@uxopro.com>; Bo Stewart <Bo@Praxis-Enviro.com>

Cc: Cosler, Doug <Doug.Cosler@TechLawInc.com>; Brasaemle, Karla <Karla.Brasaemle@TechLawInc.com>

Subject: RE: Williams - ST012 - Period ending 5/12 report

You people need to see where the high temperatures are in relation to where they plan on trying to treat

-----Original Message-----

From: Dan Pope [mailto:DPope@css-inc.com]

Sent: Thursday, June 22, 2017 4:29 PM

To: d'Almeida, Carolyn K. <dAlmeida.Carolyn@epa.gov>; Davis, Eva <Davis.Eva@epa.gov>; Wayne Miller <Miller.Wayne@azdeq.gov>; Jennings, Eleanor <Eleanor.Jennings@parsons.com>; Steve Willis <steve@uxopro.com>; Bo Stewart <Bo@Praxis-Enviro.com>

Cc: Cosler, Doug <Doug.Cosler@TechLawInc.com>; Brasaemle, Karla <Karla.Brasaemle@TechLawInc.com>

Subject: RE: Williams - ST012 - Period ending 5/12 report

Sounds reasonable to me.

-----Original Message-----

From: d'Almeida, Carolyn K. [mailto:dAlmeida.Carolyn@epa.gov]

Sent: Thursday, June 22, 2017 4:27 PM

To: Davis, Eva; Dan Pope; Wayne Miller; Jennings, Eleanor; Steve Willis; Bo Stewart

Cc: Cosler, Doug; Brasaemle, Karla

Subject: RE: Williams - ST012 - Period ending 5/12 report

Just a guess, but I think the concern is a 1 degree change in temp over course of day could be a stressor on the bugs that are present in that location. I suspect they realize that EBR wont be effective in the SEE treatment area because it is too hot, that’s why they are focusing on the perimeter. And if they do significant extraction, the temperature redistribution will kill off the bugs that are present.

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"Because a waste is a terrible thing to mind…"

-----Original Message-----

From: Davis, Eva

Sent: Thursday, June 22, 2017 2:10 PM

To: d'Almeida, Carolyn K. <dAlmeida.Carolyn@epa.gov>; Dan Pope <DPope@css-inc.com>; Wayne Miller <Miller.Wayne@azdeq.gov>; Jennings, Eleanor <Eleanor.Jennings@parsons.com>; Steve Willis <steve@uxopro.com>; Bo Stewart <Bo@Praxis-Enviro.com>

Cc: Cosler, Doug <Doug.Cosler@TechLawInc.com>; Brasaemle, Karla <Karla.Brasaemle@TechLawInc.com>

Subject: FW: Williams - ST012 - Period ending 5/12 report

I have a real disconnect on this - hope the microbiologists on the call know more about this than I do - they are concerned that a 1F/day temperature increase in the extraction wells could affect the microbial population, but they think the temps out there (see attached report and look at where the TMPs are relative to where they plan on pumping) aren't a problem? Can those bugs work at temps up to 200F?

-----Original Message-----

From: Smallbeck, Donald R. [mailto:Donald.Smallbeck@amecfw.com]

Sent: Monday, June 12, 2017 10:06 AM

To: 'Wayne Miller' <Miller.Wayne@azdeq.gov>; d'Almeida, Carolyn K. <dAlmeida.Carolyn@epa.gov>

Cc: JERRARD, CATHERINE V CIV USAF HAF AFCEC/CIBW <catherine.jerrard@us.af.mil>; Pearson, Stuart C. <Stuart.Pearson@amecfw.com>; 'steve@uxopro.com' <steve@uxopro.com>; Davis, Eva <Davis.Eva@epa.gov>; d p <DPope@css-dynamac.com>; 'Brasaemle, Karla' <KBrasaemle@TechLawInc.com>; Levine, Herb <Levine.Herb@epa.gov>

Subject: Williams - ST012 - Period ending 5/12 report

BCT members

Please find attached for your information the preliminary report describing ST012 activities for the period from April 29 thru May 12, 2017.

D.R. Smallbeck

Principal Program Manager

Construction Remediation

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