Ex. 5 Deliberative Process (DP)

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From: Jennings, Eleanor <Eleanor.Jennings@parsons.com>
Sent: Thursday, September 20, 2018 3:50 PM
To: Brasaemle, Karla <Karla.Brasaemle@TechLawInc.com>; 'd'Almeida, Carolyn K.' <dAlmeida.Carolyn@epa.gov>
Cc: Goers, Nicole <Nicole.Goers@TechLawInc.com>; Davis, Eva <Davis.Eva@epa.gov>; Dan Pope <DPope@css-inc.com>; Wayne Miller <Miller.Wayne@azdeq.gov>; Paula Panzino <Panzino.Paula@azdeq.gov>
Subject: RE: 2018-9-20 - wafb - FYI - ejennings DRAFT comments -microbial insights data rpt - ST012-ej parsons

Sorry Karla – I'm behind in the email chain, and didn't realize you had offered to reach out to SiREM. If Jeff gets back to me, I'll make sure you get onto our communications, or we can set up a conference call between the three of us (?). Didn't mean to cut you out!

Thanks for those attachments, though. I know that ORM2 (SiREM's anaerobic benzene biodegrader) is commercially available. I think it may still be a mixed consortium of bacteria, though. We can ask Jeff to find out any updates on the bioaugmentation culture available.

FYI: Elizabeth Edwards is at the Univ of Toronto, and she's VERY highly regarded in the world of anaerobic BTEX biodegradation R&D. She and her lab collaborate with many corporate labs (Dow, DuPont, Chemours, BP, Chevron ....) and have come out with some really great work. I'm attaching another presentation that she gave earlier this year for SiREM - it may be an expanded version of the presentation you had attached, as this talk was an hour long.

Again, sorry Karla for being slow on the emails and not realizing you had already replied about SiREM. Let me know if you want me to direct Jeff over to you, if you want to have a conference call with the three of us....

Have a good evening,
Eleanor

Eleanor M. Jennings, M.S., PhD
Principal Scientist - Environmental Microbiology and Biogeochemistry
Eleanor.Jennings@Parsons.com
202.302.9996

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

From: Brasaemle, Karla <Karla.Brasaemle@TechLawInc.com>
Sent: Thursday, September 20, 2018 6:16 PM
To: 'd'Almeida, Carolyn K.' <dAlmeida.Carolyn@epa.gov>
Cc: Goers, Nicole <Nicole.Goers@TechLawInc.com>; Davis, Eva <Davis.Eva@epa.gov>; Dan Pope <DPope@css-inc.com>; Wayne Miller <Miller.Wayne@azdeq.gov>; Jennings, Eleanor <Eleanor.Jennings@parsons.com>; Paula Panzino <Panzino.Paula@azdeq.gov>
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Yes, it appears that SiREM has developed a benzene bioremediation culture in cooperation with a Canadian university. It's pretty new, but may be in commercial projection by now. It's after hours back east, so I cannot contact them today to check. Here is a powerpoint and a pdf of a webpage about benzene bioaugmentation cultures.

Karla Brasaemle, P.G.,
TechLaw, Inc.
415-762-0566

From: d'Almeida, Carolyn K. <dAlmeida.Carolyn@epa.gov>
Sent: Thursday, September 20, 2018 3:07 PM
To: Brasaemle, Karla <Karla.Brasaemle@TechLawInc.com>
Cc: Goers, Nicole <Nicole.Goers@TechLawInc.com>; Davis, Eva <Davis.Eva@epa.gov>; Dan Pope <DPope@css-inc.com>; Wayne Miller <Miller.Wayne@azdeq.gov>; Jennings, Eleanor <Eleanor.Jennings@parsons.com>; Paula Panzino <Panzino.Paula@azdeq.gov>
Subject: RE: 2018-9-20 - wafb - FYI - ejennings DRAFT comments -microbial insights data rpt - ST012-ej parsons

Does MI or other vendor sell such amendments? Would bench scale tests be advisable first?

Carolyn d'Almeida
Remedial Project Manager
Federal Facilities Branch (SFD 8-1)
US EPA Region 9 Laboratory
1337 South 46th Street, Building 201
Richmond, CA 94804
(415) 972-3150

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

From: Brasaemle, Karla [mailto:Karla.Brasaemle@TechLawInc.com]
Sent: Thursday, September 20, 2018 2:59 PM
To: d'Almeida, Carolyn K. <dAlmeida.Carolyn@epa.gov>
Cc: Nicole Goers <Nicole.Goers@TechLawInc.com>
Subject: RE: 2018-9-20 - wafb - FYI - ejennings DRAFT comments -microbial insights data rpt - ST012-ej parsons

Hi Carolyn,

This is not good news. The AF contractor should be acquiring a suitable bio-augmentation culture that would degrade benzene and other petroleum products. Without injecting a suitable culture, sulfate should not be injected.

Karla Brasaemle, P.G.,
TechLaw, Inc.
415-762-0566

From: d'Almeida, Carolyn K. <dAlmeida.Carolyn@epa.gov>
Sent: Thursday, September 20, 2018 2:49 PM
To: Brasaemle, Karla <Karla.Brasaemle@TechLawInc.com>
Cc: Goers, Nicole <Nicole.Goers@TechLawInc.com>
Subject: FW: 2018-9-20 - wafb - FYI - ejennings DRAFT comments -microbial insights data rpt - ST012-ej parsons

FYI
Eleanor's analysis of the microbial insights data attached. See conclusion on page 10:

5 SUMMARY

Frozen microbial community DNA, initially obtained for a narrow-spectrum genetic profile of six Site samples, was used for a more broad Quant-Array (Petroleum) genetic analysis. The key results of this available data reveal:

- No samples revealed detectable levels of anaerobic benzene-specific biodegradation.
- Although aerobic biodegradation of aromatic hydrocarbons was detected in two of the six samples, it cannot be confirmed that these results are from benzene-specific bioattenuation or if the results reflect the degradation of other, non-benzene, aromatic hydrocarbons.
- The presence of an indigenous, benzene-specific biodegrading microbial population has not yet been confirmed for this Site.
- Benzene biodegradation under sulfate-reducing conditions is not occurring at this Site.

This data should be strongly considered when future Site MNA or EBR plans are being employed.

Carolyn d'Almeida
Remedial Project Manager
Federal Facilities Branch (SFD 8-1)
US EPA Region 9 Laboratory
1337 South 46th Street, Building 201
Richmond, CA 94804
(415) 972-3150

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

From: Wayne Miller [mailto:Miller.Wayne@azdeq.gov]
Sent: Thursday, September 20, 2018 1:08 PM
To: d'Almeida, Carolyn K. <dAlmeida.Carolyn@epa.gov>
Cc: Davis, Eva <Davis.Eva@epa.gov>; Dan Pope <DPope@css-inc.com>; Paula Panzino <Panzino.Paula@azdeq.gov>
Subject: 2018-9-20 - wafb - FYI - ejennings DRAFT comments -microbial insights data rpt - ST012-ej parsons

For initial EPA-ADEQ discussion points, attached are Eleanor Jennings initial draft comments.

Wayne Miller
Waste Programs Division,
Remedial Projects Section,
Federal Projects Unit

Arizona Department of Environmental Quality
1110 West Washington Street
Phoenix, AZ 85007

Direct Line: 602.771.4121
Email: miller.wayne@azdeq.gov

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