From:	Williams, Jonathan
To:	Madabhushi, Sriram [USA]; Greutert, Ed [USA]
Cc:	Nadagouda, Mallikarjuna; Zavala, Bernie; McDonnell, Kimberlee
Subject:	RE: [External] Re: FMC OU Treatability Testing Study Review
Date:	Wednesday, April 22, 2015 4:11:18 PM
Attachments:	image001.png

Conference Call Date/Time: 9-10 am Pacific Time Thursday, April 23, 2015

Call-in Number: (866) 299-3188 followed by [redacted]

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From: Madabhushi, Sriram [USA] [mailto:madabhushi_sriram@bah.com]
Sent: Wednesday, April 22, 2015 1:56 PM
To: Williams, Jonathan; Greutert, Ed [USA]
Cc: Nadagouda, Mallikarjuna; Zavala, Bernie; McDonnell, Kimberlee
Subject: RE: [External] Re: FMC OU Treatability Testing Study Review

Certainly.

I can join on a call at 9:00 pacific time tomorrow and we can discuss the proposed strategy.

Please provide me conference call number or I will be happy to set one up for us.

Thanks,
Sriram

Sriram Madabhushi
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(803) 446-0607 Cell
madabhushi_sriram@bah.com

From: Williams, Jonathan [mailto:Williams.Jonathan@epa.gov]
Sent: Wednesday, April 22, 2015 3:38 PM
To: Madabhushi, Sriram [USA]; Greutert, Ed [USA]
Cc: Nadagouda, Mallikarjuna; Zavala, Bernie; McDonnell, Kimberlee
Subject: RE: [External] Re: FMC OU Treatability Testing Study Review

Thanks for your help. I've tentatively set up a teleconference for tomorrow, at 9 am Pacific Time, with Malik Nadagouda from EPA's Cincinnati Laboratory. Is that date/time workable for you too? My immediate interest is to discuss with you and Malik any overall concerns or questions you might have about the proposed treatment system.

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From: Madabhushi, Sriram [USA] [mailto:madabhushi_sriram@bah.com]
Sent: Tuesday, April 21, 2015 4:27 PM
To: Williams, Jonathan; Greutert, Ed [USA]
Cc: McDonnell, Kimberlee
Subject: RE: [External] Re: FMC OU Treatability Testing Study Review

Thank you for the information. I have reviewed the initial comments and am paying attention to the cited comments below. I will also focus on the design with particular attention to potential for scaling the system up if needed.

Look forward to your call in the next few days.

Thanks,
Sriram

With Regards,

Sriram Madabhushi
Associate

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100 YEARS
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From: Williams, Jonathan [mailto:Williams.Jonathan@epa.gov]
Sent: Tuesday, April 21, 2015 6:15 PM
To: Greutert, Ed [USA]

Cc: Madabhushi, Sriram [USA]; McDonnell, Kimberlee
Subject: RE: [External] Re: FMC OU Treatability Testing Study Review

Thanks for the introduction. Attached are initial EPA comments on the preliminary RD report and associated document. Please review for context if you haven't already. (The additional comments EPA had intended to provided April 3, 2015 are still being developed and, at this juncture, we're working to pull together input from different reviewers in time to finalize them next week.)

In addition to reviewing the proposed treatment technology as described, and commenting on it as presented, please be sure that we're building upon concepts described in General Comments 1, 5, and 6 Specific Comments on Section 4.2 and Appendix B.

A recent question posed by an EPA colleague is whether the treatment system has the capacity or could be easily scaled up to handle a larger than predicted contaminant stream (volume and concentration) as EPA may comment that a couple of additional extraction wells in areas of more contaminated groundwater might be needed.

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From: Greutert, Ed [USA] [mailto:greutert_ed@bah.com]
Sent: Tuesday, April 21, 2015 1:25 PM
To: Williams, Jonathan
Cc: Madabhushi, Sriram [USA]
Subject: FW: [External] Re: FMC OU Treatability Testing Study Review

Jonathan-

This email is an introduction to Sriram Madabushi. Sriram is going to look at the 30% hydro design document. He has started in on it and I have briefed him on the background. Although his schedule is pretty tight for Thursday, he is available for a telecon on Wednesday or Friday of this week and might be able to do one Thursday if need be depending on the time. I've worked with Sriram for many years and he has a lot of experience performing work for EPA.

He will have draft comments no later than Monday afternoon. Please let me know if you have any questions and feel free to contact Sriram directly.

Tx,

Ed Greutert, P.E.
Sr. Associate
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From: Greutert, Ed [USA]
Sent: Tuesday, April 21, 2015 7:39 AM
To: Greutert, Ed [USA]
Subject: FW: [External] Re: FMC OU Treatability Testing Study Review

Ed Greutert, P.E.
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From: Nadagouda, Mallikarjuna [mailto:nadagouda.mallikarjuna@epa.gov]
Sent: Monday, April 20, 2015 7:18 PM
To: Williams, Jonathan; Barth, Edwin; Patterson, Craig; Zavala, Bernie; Greutert, Ed [USA]
Cc: McDonnell, Kimberlee; McKernan, John
Subject: [External] Re: FMC OU Treatability Testing Study Review

All,

I am available this week and you can schedule a conference call at your convenience. In case if you want to reach me directly, you can call me at 513-569-7232.

Regards
Mallikarjuna

From: Williams, Jonathan
Sent: Friday, April 17, 2015 4:25 PM
To: Barth, Edwin; Patterson, Craig; Zavala, Bernie; Greutert, Ed [USA]
Cc: McDonnell, Kimberlee; McKernan, John; Nadagouda, Mallikarjuna
Subject: RE: FMC OU Treatability Testing Study Review

Thanks for the info. Bernie and I would like to discuss groundwater treatment with you all at your earliest convenience, and perhaps include EPA oversight contractor BAH in the conversation too. Please let us know about your availability next week.

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From: Barth, Edwin
Sent: Thursday, April 16, 2015 1:09 PM
To: Patterson, Craig; Williams, Jonathan; Zavala, Bernie
Cc: McDonnell, Kimberlee; McKernan, John; Nadagouda, Mallikarjuna
Subject: RE: FMC OU Treatability Testing Study Review

Agree w Craig, I thought by now some form of Fe trt had already been considered, this concept has been around for many years, initially using Fe from sewage sludges, but not necessarily media based.

From: Patterson, Craig
Sent: Thursday, April 16, 2015 4:00 PM
To: Williams, Jonathan; Barth, Edwin; Zavala, Bernie
Cc: McDonnell, Kimberlee; McKernan, John; Nadagouda, Mallikarjuna
Subject: RE: FMC OU Treatability Testing Study Review

Jonathan,

There are anion exchange resins and iron based media that can selectively remove phosphorus and arsenic. Mallik Nadagouda with EPA in Cincinnati has been working on a modified E33 based media for removal of phosphorus and arsenic simultaneously with promising results (see attached). According to Mallik his media can outperform coagulants and polymers.

After tomorrow, I will be out of the office except for a few days until the week after Memorial day. Due to my current schedule, it might be best to talk with Mallik rather than me on this one. My apologies for not being available.

Best Regards,
Craig

Craig Patterson, P.E.
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From: Williams, Jonathan
Sent: Thursday, April 16, 2015 3:10 PM
To: Patterson, Craig; Barth, Edwin; Zavala, Bernie
Cc: McDonnell, Kimberlee; McKernan, John
Subject: RE: FMC OU Treatability Testing Study Review

Thanks for the reply. Bernie and I have both been preoccupied with other matters the past couple of weeks.

Yes, we would like to discuss other groundwater treatment options. Right now, we have already provided a general comment requesting that the RD report provide the rationale for the treatment train selected.

If EPA thinks it's the best alternative then our general comment might be sufficient. The remainder of our groundwater treatment comments would then focus on details we think are missing, misstated, unclear, etc. On the other hand, If EPA thinks that other treatment alternatives deserve further consideration then additional comments about why, and which ones, would be appropriate.

Please let us know of your updated availability the next couple of weeks to discuss. Thanks.

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From: Patterson, Craig
Sent: Thursday, April 02, 2015 10:19 AM
To: Williams, Jonathan; Barth, Edwin; Zavala, Bernie
Cc: McDonnell, Kimberlee; McKernan, John
Subject: RE: FMC OU Treatability Testing Study Review

Thanks Jonathan for the additional comments, they provide some historical perspective. I am in M-W next week but out of the office Th-F if you want to discuss other options for treatment.
Craig

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From: Williams, Jonathan
Sent: Thursday, April 02, 2015 1:00 PM
To: Barth, Edwin; Patterson, Craig; Zavala, Bernie
Cc: McDonnell, Kimberlee; McKernan, John
Subject: RE: FMC OU Treatability Testing Study Review

Ed and Craig:

Thanks for your quick review and initial thoughts. I realized that I had not sent you EPA's initial set of comments on the 30 percent RD as I had intended. They're now attached. Me, Bernie, and a colleague from the Idaho Department of Environmental Quality contributed to them. Additional comments from EPA to FMC will follow although not by April 3, 2015 as we had anticipated.

Your focus on the treatability study, as Bernie and I requested, is appreciated. Key "big picture" questions related to the proposed treatment system that we would also like you to consider include the following:

Are there other types of water treatment which could also be used for removing As, P, and other contaminants in the effluent that deserve consideration? If so, what would be needed to rule them in/out before moving to the next design phase?

Might additional polishing steps be needed prior to discharging into a percolation pond? Why or why not?

Thanks in advance for your continued review. I think that Bernie and I can be available early next week to discuss if that's workable for you guys.

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From: Barth, Edwin
Sent: Thursday, April 02, 2015 7:50 AM
To: Patterson, Craig; Zavala, Bernie; Williams, Jonathan
Cc: McDonnell, Kimberlee; McKernan, John
Subject: RE: FMC OU Treatability Testing Study Review

Like Craig, I have minimal comments so far, jar testing is a very basic procedure. The only item you may want to ask is whether or not a pre-oxidation step would increase As removal. Given both that

the pKa 1,2, and 3 for H3PO4 are 2.1, 7.21, and 12.3 and that the jar test were sufficient within the pH range of 6-9, staying in this range is important.

From: Patterson, Craig
Sent: Wednesday, April 01, 2015 10:47 AM
To: Zavala, Bernie; Williams, Jonathan
Cc: McDonnell, Kimberlee; McKernan, John; Barth, Edwin
Subject: RE: FMC OU Treatability Testing Study Review

Hello Jon/Bernie,
I had a chance to review the report this morning and it looks good to me. The addition of ferric chloride and the polymer brought the As and Phosphorus below their regulatory limits. Most of the turbidity is comprised of particles < 8 microns. The primary constituents in the sludge will be coagulant based. The overall approach seems sound. I have attached a file with 4 typos (in faint red). I apologize for not having anything more profound to report,
Craig

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From: Barth, Edwin
Sent: Tuesday, March 31, 2015 9:15 AM
To: Williams, Jonathan
Cc: Zavala, Bernie; McDonnell, Kimberlee; Patterson, Craig; McKernan, John
Subject: RE: FMC OU Treatability Testing Study Review

Jon/Bernie: the package has arrived. Before Thur, you wanted us to quickly scan the document for:

1) Were the appropriate technologies considered?
2) Non-COCs issues (dissolve solids)
3) Overall approach

Since I am leaving early today and tomorrow (Spring Break), Craig will get back to you directly via email. We can provide more input after your initial rush for comments before your THUR mtg.

From: Williams, Jonathan
Sent: Thursday, March 26, 2015 7:37 PM
To: Barth, Edwin
Cc: Zavala, Bernie; McDonnell, Kimberlee
Subject: FMC OU Treatability Testing Study Review

This e-mail is to confirm that Bernie and I are available tomorrow at 10 am PDT (1 pm EDT) to discuss an EPA review of FMC's treatability testing results. You might recall that you and Craig reviewed the treatability testing work plan last fall after FMC took the risk to implement it without EPA approval. Shall we call your office or some other number?

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