From: Howell, Tonya
To: Meyer, Lisa A
Cc: Miller, Barbara J; Brown, Randolph
Subject: RE: Findett OU4 - bioaugmentation
Date: Thursday, August 04, 2022 11:24:00 AM

Thanks, Lisa.

Tonya Howell
Remedial Project Manager / Superfund Redevelopment Coordinator
Superfund and Emergency Management Division
U.S. Environmental Protection Agency, Region 7
913-551-7589

From: Meyer, Lisa A <LMeyer2@ameren.com>
Sent: Thursday, August 04, 2022 7:13 AM
To: Howell, Tonya <Howell.Tonya@epa.gov>
Cc: Miller, Barbara J <BMiller2@ameren.com>; Meyer, Lisa A <LMeyer2@ameren.com>
Subject: RE: Findett OU4 - bioaugmentation

Tonya – see attached summary of the bioaugmentation activities that occurred on July 7th.

Lisa

From: Howell, Tonya <Howell.Tonya@epa.gov>
Sent: Wednesday, August 3, 2022 10:10 AM
To: Meyer, Lisa A <LMeyer2@ameren.com>
Cc: Miller, Barbara J <BMiller2@ameren.com>
Subject: [EXTERNAL] Findett OU4 - bioaugmentation

EXTERNAL SENDER **STOP.THINK.QUESTION.**
Verify unexpected requests before opening links or attachments.

Lisa, per our earlier conversation today, the blue text below includes the questions the city asked me when I first notified them about the injections. I then provided them with the info in the below email. If you have any additional information to fill in the gaps between the below email with the

proposed work and the questions below in blue, it might be good to have available for today's call.

BTW, does Ameren typically submit a document after completion of the work to describe the work that actually happened? If so, is that something that is still being drafted? Typically EPA would expect to see a document (or email) with a description/summary of the work that actually occurred and how that may have deviated from the proposed work.

Can you please provide additional details regarding the bioaugmentation activities planned for next week including the specific scope of work that will be performed? Ideally the location, quantity, types of amendments to be used and method for injection and any performance monitoring that will be conducted to evaluate the effectiveness of treatment would be helpful. Can you please also confirm that the proposed bioaugmentation activities are consistent with the scope of work described in the Record of Decision for the Ameren Substation?

Tonya Howell
Remedial Project Manager / Superfund Redevelopment Coordinator
Superfund and Emergency Management Division
U.S. Environmental Protection Agency, Region 7
913-551-7589

From: Howell, Tonya
Sent: Monday, July 11, 2022 2:46 PM
To: Paul Michalski <paul.michalski@212environmental.com>
Cc: Nicholas Galla <Nicholas.Galla@stcharlescitymo.gov>; Todd Aseltyne <todd.aseltyne@212environmental.com>
Subject: RE: Findett OU4

See below for information regarding the bioaugmentation injections that started last Thursday and are continuing this week.

From Ameren via LEA:

We are recommending to use 2- 55-gallon drums EOS and 2-19L casks of BAC-9 (DHC bugs), per details below. The groundwater field parameters do suggest that pH in the target treatment wells

are a little on the low side (right around 6, > 6.5 is recommended for Dhc) so we will be adding a pH buffer too.

Assumptions:

- Injecting 30,000 gallons into an area of approx. 50 feet wide by 80 feet long encompassing the wells of MW-8, MW-10, MW-11, MW-12, and MW-13 (what it will take). Using an effective porosity of 0.3 in the sands, over a 10-foot vertical interval, the estimated pore volume to be on the order of 90,000 gallons.
- With a target minimum of 10^7 bacteria cells per liter groundwater we would need 2 - 19 L casks to cover that zone.
- 2-55gal drums of EOS Pro @75% digestible carbon mixed into the 90,000 gal of pore volume groundwater should give us around 900 mg/L of carbon (EOS Pro has both soluble and extended release Carbon). We will NOT see the 900mg/L in groundwater due to the slow release, but we need to maintain a min of 100 mg/L in groundwater.
- Nutrients is the biggest concern: nitrogen in particular is very low at the site and is not a reported significant ingredient in EOS Pro. Mike recommends Miracle Gro, it is 24% nitrogen. Based on his calcs, 2- 10lb boxes of Miracle Gro diluted into the 90,000 gallons of pore volume of the treatment area (10-ft interval), should provide a min of 6 mg/L nitrogen in the groundwater. We use Miracle Gro in the lab and try to maintain a 1mg/L nitrogen minimum in the reactors. We want to stay below any regulatory concern on nitrates in groundwater which I believe is 10 mg/L as nitrate. It may be above this during the initial injection but will disperse quickly.
- A small volume of sodium bicarbonate will used as a pH buffer to get the treatment zone into more neutral range above 6.5.
- Sodium sulfide will be added to decrease the ORP as in previous injections. We already have that onsite from the previous work. Typically drop the batches to -300 or lower to better ensure anaerobic conditions and prevent bug loss during injection.

The existing monitoring wells will be used – MW-11 and MW-12 were specifically put in for this purpose, but feeding can be accomplished slowly at any of the other MWs.

The injections are at the 35-45 foot levels where the well screens are set.

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