Message

**From:** Wayne Miller [Miller.Wayne@azdeq.gov]
**Sent:** 3/5/2016 12:04:20 AM
**To:** d'Almeida, Carolyn K. [dAlmeida.Carolyn@epa.gov]; Davis, Eva [Davis.Eva@epa.gov]
**CC:** Steve Willis [steve@uxopro.com]; Dan Pope [DPope@css-dynamac.com]; BOYD, STEWART [Boyd.Stewart@epa.gov]
**Subject:** 2016-4-3 - wafb - good - Draft Agency letter - request SEE continuation - cda rev1

Letter well done. Bo Stewart, Dan Pope, Eva Davis and Steve Willis comments appreciated.

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**From:** d'Almeida, Carolyn K. [mailto:dAlmeida.Carolyn@epa.gov]
**Sent:** Friday, March 04, 2016 4:09 PM
**To:** Wayne Miller <Miller.Wayne@azdeq.gov>; Davis, Eva <Davis.Eva@epa.gov>
**Cc:** Steve Willis <steve@uxopro.com>; Dan Pope <DPope@css-dynamac.com>; BOYD, STEWART <Boyd.Stewart@epa.gov>
**Subject:** 2016-4-3 - wafb - Draft Agency letter - see continuation - cda rev1

Changes incorporated – last call for comments….?

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**From:** Bo Stewart [mailto:Bo@praxis-enviro.com]
**Sent:** Friday, March 04, 2016 1:39 PM
**To:** d'Almeida, Carolyn K. <dAlmeida.Carolyn@epa.gov>
**Cc:** Steve Willis <steve@uxopro.com>
**Subject:** Re: Draft Agency letter

Hi Carolyn,

I made a couple of more simple edits to add to Steve's. It looks good to me but we should be careful with comparisons to the pilot test. I'm not recommending any changes to the letter but I wanted to provide some comments and perspective on the comparison:

The full-scale SEE treatment volume (410,000 cy) is almost 10 times larger than the pilot (45,600 cy) and they have already injected 36 times as much steam. On a per cubic yard basis, they have injected 730 lbs of steam per cubic yard (pilot was only 180 lbs of steam per cy, as it was terminated early). The recommendations and lessons learned in the Pilot Evaluation Report (Appendix N, TEE Design and Implications for Scale-Up) recommended full scale design for injected energy of 0.70 to 1.0 million BTU per cubic yard and this is equivalent to injecting 600 to 880 lbs of steam per cubic yard. So they are within the recommended range from the pilot test.

To date, they have removed of 6 lbs of hydrocarbon per cubic yard while the pilot was 2.6 lbs/cy (it was terminated early as everyone acknowledged) and the pilot test evaluation recommended more steam to increase that mass removal.

My issue from my start on the full-scale SEE project has been the very low extraction rate. The pilot test operated at about 80 gpm while the full-scale SEE has averaged 113 gpm to address a much larger treatment volume and much higher steam injection rates. Recall, during the pilot test, the loss of a single extraction well surrounding the injection well resulted in a temporary loss of containment despite a relatively high extraction rate from the other wells. Under the current SEE conditions, the relatively low extraction rate is still playing "catch up" with the early steam injection rates. The steam zone has extended well beyond the design treatment zone and continued extraction is necessary to derive the benefit of this heating as it has resulted in more contaminants available for extraction than under ambient conditions.

I'm just passing along some thoughts on the project.

Have a great weekend,
Bo

On 3/3/2016 9:39 PM, Steve Willis wrote:

> I made a few grammatical edits, otherwise it looks pretty good to me. Anything to add?
>
> FYI, I'm on PTO Friday and will be on the road much of the day, so I'm going to send my edits to Carolyn. Please be sure to respond to her and let her know if you have any comments. Also, you can send me a text to let me know.
>
> Thanks,
>
> *Steven A. Willis, R.G.*
> *UXO Pro, Inc.*
> *Arizona Registered Geologist #30448*
> *(480) 316-3373*
> *steve@uxopro.com*

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Lloyd "Bo" Stewart, PhD, PE
Praxis Environmental Tech., Inc.

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