From: Mike.Grigorieff@CH2M.com
To: Brian.Dean@aecom.com; Wetmore, Cynthia; mikepalmer@cox.net
Cc: jdinello@demaximis.com
Subject: RE: TGRS Update
Date: Friday, November 21, 2014 12:05:42 PM
Attachments: image001.png

Montrose/AECOM can remove some uncertainty and get a better feel for expected performance if they do a bit of analysis before the batch test (perhaps Geosyntec can do this) as suggested below:

- **AOP System:** Estimate roughly how much VOC removal will occur in the HiPOX unit. I recall this information was included in some earlier test reports prepared by HiPOx and Geosyntec. I recall a general VOC removal of about 30% overall, however, I think the earlier reports addressed removal of **specific VOCS**, e.g. alkenes (easy to remove) vs. alkanes (harder to remove). This would provide approximate information regarding what VOC concentrations would be going into the air stripper.

- **Air Stripping System:** Based on this approximate AOP effluent information from the above analysis, the performance of the air stripper at lower air flow rates/lower air water ratio can be estimated. QED has an on line air stripper simulation program that can provide approximations of VOC removal by specific VOCs at different air/water ratios. More importantly, this simulation would provide better understanding of how much "cushion" there might in Air Stripper performance at the lower air/water ratio going forward even on a temporary basis until the air stripper blower problem gets resolved.

- **LGAC System:** The LGAC is the 3rd step and is provided to remove residual VOCs including those that are not too amenable to AOP or air stripping treatment. I would not expect the LGAC system to be impacted in a short 24 hour test. However, if at some point, the overall treatment system will be operated with a sub-par air stripper for a more prolonged period of time until it is fixed, the above analysis would be helpful in assessing the potential impact on the LGAC usage/performance going forward until the air stripper blower problem is resolved.

Mike

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From: Dean, Brian [mailto:Brian.Dean@aecom.com]
Sent: Friday, November 21, 2014 11:38 AM
To: Wetmore, Cynthia; Mike Palmer; Grigorieff, Mike/SCO
Cc: jdinello@demaximis.com
Subject: RE: TGRS Update

Air stripping does not treat pCBSA. Air stripping was added to treat low concentration VOCs like methylene chloride and 1,2-DCA that are not readily oxidized or adsorbed by LGAC.

The HiPOx system will treat the pCBSA.

From: Wetmore, Cynthia [mailto:Wetmore.Cynthia@epa.gov]
Sent: Friday, November 21, 2014 11:29 AM
To: Mike Palmer; Dean, Brian; Mike.Grigorieff@CH2M.com
Cc: jdinello@demaximis.com
Subject: RE: TGRS Update

Agreed on robust system comment. I am unfamiliar with the design requirements to assess whether the ISGS for the COCs will be met. Maybe the VOCs are removed, but at the expense of pCBSA reduction. I just don't know.

Mike G.?

Cynthia Wetmore, Technical Support Section
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From: Mike Palmer [mailto:mikepalmer@cox.net]
Sent: Friday, November 21, 2014 10:51 AM
To: 'Dean, Brian'; Mike.Grigorieff@CH2M.com
Cc: jdinello@demaximis.com; Wetmore, Cynthia
Subject: RE: TGRS Update

Mike G and Cynthia
Do you agree?
Mike

From: Dean, Brian [mailto:Brian.Dean@aecom.com]
Sent: Friday, November 21, 2014 10:43 AM
To: Mike Palmer; Mike.Grigorieff@CH2M.com
Cc: jdinello@demaximis.com; Wetmore.Cynthia@epa.gov
Subject: RE: TGRS Update

With HiPOx in line, the lower air to water ratio should be fine in achieving the ISGS discharge requirements. The three systems in series is a relatively robust treatment train.

Brian

From: Mike Palmer [mailto:mikepalmer@cox.net]
Sent: Friday, November 21, 2014 10:11 AM
To: Dean, Brian; Mike.Grigorieff@CH2M.com
Cc: jdinello@demaximis.com; Wetmore.Cynthia@epa.gov
Subject: RE: TGRS Update

All
RE the Air stripper issue, Brian and I will address it offline. We need to have all the information at hand and then we can make a recommendation to Montrose before proceeding. Cynthia I will keep you posted as we progress but the flow rates from the blowers is unacceptable to me. I agree with Brian we will not have this resolved by next week.

My question to the Brian is there a highly likelihood that with the Hip ox system online that we would be able to achieve our ISGS for the discharge? If that is the case I would like to run the batch treatment to demonstrate that we can run all of the wells/run the treatment train. I believe this is advantageous. I realize if we don't pass we would have to redo this test.

Brian please let us know your thoughts.
Mike

From: Dean, Brian [mailto:Brian.Dean@aecom.com]
Sent: Friday, November 21, 2014 9:25 AM
To: Mike.Grigorieff@CH2M.com
Cc: jdinello@demaximis.com; mikepalmer@cox.net; Wetmore.Cynthia@epa.gov
Subject: RE: TGRS Update

I think we can fix the cavitation problem by next Tuesday – it is a day of welding work.

It is unlikely that the air stripper issue can be fixed prior to functional testing. We are not

done fighting with QED yet. Their blowers only did 2,000 to 2,300 cfm each during a dry test, so they never achieved 2,600 cfm even under low backpressure conditions. The total pressure loss across the system is only 2" WC over the QED recommended range, and I seriously doubt that dropping 2" WC would allow the blowers to achieve the target flow.

In any event, to install a booster blower, we would have to locate and procure an in-stock model, build a small equipment pad, revise the steel piping, add a support, run conduit and wire between the blower and an empty bucket in the control room, install disconnect, and revise PLC program and screen controls. It is not something that can be completed in 2 or 3 days.

The actual air to water ratio is approximately 36:1. The design air to water ratio from the Revised Basis of Design Report is 48:1. Air to water ratios above 30 are generally required, and air to water ratios above 50 are typically recommended. The difference in stripping efficiency between 36:1 and 48:1 is not that dramatic, but the design ratio was already at the low end of the recommended range. We will continue to address this issue.

Brian

From: Mike.Grigorieff@CH2M.com [mailto:Mike.Grigorieff@CH2M.com]
Sent: Thursday, November 20, 2014 9:33 PM
To: Dean, Brian
Cc: jdinello@demaximis.com; mikepalmer@cox.net; Wetmore.Cynthia@epa.gov
Subject: RE: TGRS Update

Brian,

Thanks for the update. Based on some of the problems you noted below, it seems it will take a while to resolve them before functional testing can be done, e.g. getting the transfer pumps and air stripper issues resolved. It doesn't seem like batch testing next Tuesday is realistic.

Please advise.

Mike

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From: Dean, Brian [mailto:Brian.Dean@aecom.com]
Sent: Thursday, November 20, 2014 6:01 PM

To: Mike Palmer; 'Wetmore, Cynthia'
Cc: Grigorieff, Mike/SCO; 'Jaime Dinello'
Subject: RE: TGRS Update

It's possible, although Tuesday would be a safer bet. See below for today's update:

- Piping and conduit in the intersection complete with one exception; need to make connection to 2"x4" G-EW-3 piping. Will make that connection tomorrow morning and pressure test. Will begin backfilling the intersection with slurry tomorrow afternoon.
- Installation of power and control wiring to MBFB-EW-1, BF-EW-1, and G-EW-1, and UBA-EW-3 is 95% complete. Will finish tomorrow morning and starting testing the controls.
- Fiber optic cable was pulled from Satellite #3 to the west end of 204th Street. Will complete installation to control room tomorrow.
- Will start pulling Satellite #2 fiber optic cable and G-EW-3 power and control wiring on Saturday.
- Completed parking stall stenciling and wheel stop installation.
- Completed repaving of Normandie Ave between Stations 113+00 and 116+00.
- There are 3 transfer pumps that are not working properly:
    - Utility Tank pump 3650A was returned to the supplier for repair under warranty this morning (insufficient clearance between impellar and housing).
    - Both LGAC feed pumps 3660A and 3660B cavitate badly at flow rates in excess of 300 to 500 gpm. The piping was installed per Drawings M-334 and M-513, but we may need to reduce the piping size from 12" to 6" diameter closer to the feed tank or use eccentric reducers instead of concentric. We are consulting with the pump supplier to get their opinion.
- We measured 20" of water pressure loss between the air strippers and discharge stack, which is pretty low for three VGAC vessels, piping, valves, and duct heater. Nonetheless, QED is claiming that this backpressure is too much for their blowers to achieve the design flow rate and is refusing to upgrade their blowers. QED has recommended installation of a booster blower to achieve the target air flow rate of 5,200 cfm (two operating air strippers).

Brian

From: Mike Palmer [mailto:mikepalmer@cox.net]
Sent: Thursday, November 20, 2014 5:00 PM
To: Dean, Brian; 'Wetmore, Cynthia'
Cc: Mike.Grigorieff@CH2M.com; 'Jaime Dinello'
Subject: RE: TGRS Update

Brian
Thanks are we still on for the batch testing on Monday? Let us

know since I believe Mike G is planning for that day.
Mike

From: Dean, Brian [mailto:Brian.Dean@aecom.com]
Sent: Wednesday, November 19, 2014 11:39 PM
To: Wetmore, Cynthia; Mike Palmer
Cc: Mike.Grigorieff@CH2M.com; Jaime Dinello
Subject: TGRS Update

Activities completed today:

- Continued welding piping in the intersection and installing conduit. Expect to finish tomorrow. Slurry backfill is scheduled for Friday.
- Slurry backfilled 204th Street lateral today. Will repave last 300 LF of Normandie Ave tomorrow.
- Continued pulling wire in Normandie Ave and landing power/control cabling at wells/control room. Will have additional crew tomorrow to pull Satellite #3 fiber optic cable.
- Transported another 60 loads of clean soil today. Down to last few loads.
- Completed repaving around treatment plant today; see attached photos.
- Jacob had a call with QED re: air stripper performance. He asked them to fix air stripper performance at their own cost.

Brian