

**From:** [Dodds, Jennifer](#)  
**To:** [Ziegelbauer, Heather/MKE](#); [Jeffrey Howard Danko](#); [Joseph Janeczek](#); [Ryan Suennen](#); [Finney, David/BOS](#); [Mitchell, David/BOS](#); [Carey, Angela J - DNR](#)  
**Cc:** [Dodds, Jennifer](#)  
**Subject:** FW: Tyco - Arsenic Migrations Pathways Evaluation - Drilling Update and Proposed Changes  
**Date:** Wednesday, January 15, 2020 11:58:56 AM

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Hello,

In your October 31, 2019 email regarding the issues Tyco encountered while attempting to implement the June 24, 2019 Arsenic Migration Pathway Evaluation Workplan, you proposed an interim memorandum that would include an evaluation of the data collected so far and an evaluation of the need for future activities. EPA and Wisconsin DNR are requesting that the interim memorandum specifically include an evaluation of the results of the 2019 field work to determine which of the tasks and goals of the workplan were successfully completed and which were not. Additionally, recommendations should be made to address those portions of the workplan that were not satisfied.

Please provide an update on the progress of this memorandum.

Thank you,

Jennifer Dodds  
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**From:** Ziegelbauer, Heather/MKE <Heather.Ziegelbauer@jacobs.com>  
**Sent:** Thursday, October 31, 2019 1:58 PM  
**To:** Dodds, Jennifer <dodds.jennifer@epa.gov>  
**Cc:** Jeffrey Howard Danko <jeffrey.howard.danko@jci.com>; Joseph Janeczek <joseph.janeczek@jci.com>; Ryan Suennen <ryan.suennen@jci.com>; Finney, David/BOS <David.Finney@jacobs.com>; Mitchell, David/BOS <David.Mitchell2@jacobs.com>; Angela Carey <angela.carey@wisconsin.gov>  
**Subject:** RE: Tyco - Arsenic Migrations Pathways Evaluation - Drilling Update and Proposed Changes

Jennifer,

On behalf of Tyco and in response to your discussion with Jeff Danko on 10/29/19, the following is a status update for the arsenic migration evaluation activities at the Tyco Fire Products LP site.

**Phase 1 – Diver Assisted Sampling Event** – Work occurred September 16-20, proposed work scope was completed.

- All locations VP-101 to VP-106 and SD-107 and SD108 were sampled for sediment.
- All locations VP-101 to VP-106 were sampled for surface water
- VP-101 to VP-106, SD-107, SD108 and eight other locations were measured for sediment thickness
- Five samples were sent in for bulk density and grain size analysis

**Phase 2 – Drilling Event** – Work occurred October 15-26, proposed work scope was not completed. At each of the proposed drilling locations we planned to collect continuous soil samples and groundwater samples every 2 ft at each and 3 geotech samples at different locations. The following summarizes the status of each location and issues that occurred.

#### **Drilling Location Status**

- VP-101 – Collected continuous soil samples from ~0-3 ft below the bottom of the sediment
- VP-102 –
  - Collected continuous soil samples from ~0-14 ft below the bottom of the sediment
  - Collected groundwater sample from temporary well point screened from 9-11 ft below the bottom of the sediment (see details in issues below)
  - Collected 6-inch geotechnical samples at 3.5/4.0 and 4.0/4.5 using brass lined split spoon sampler (will only analyze one of these, will select best intact sample)
- VP-103 –
  - Collected continuous soil samples from ~0-20 ft below the bottom of the sediment
  - Collected groundwater sample from temporary well point from 18-20 ft below the bottom of the sediment, this sample is on hold as it is not thought to be representative. (see details in issues below)
- VP-104 - Collected continuous soil samples from ~0-14 ft below the bottom of the sediment, there was no recovery from ~2-3.5 ft
- VP-105 – Not sampled
- VP-106 – Not sampled

#### **Drilling Issues**

- Weather delays 10/15, 10/16, 10/21, 10/22
- Continuous soil sampling with split spoon is **very** slow going (about 6 to 8 ft in a half day and a full day for more footage) with blow counts much of the time greater than 50 between 50 and 100 blows per 6 inches.
- All but 1 location had much thicker glacial till than what was anticipated (thought depths would be around 8 feet or less, had bedrock at depths of 3, 14, 20 and 14 feet below the bottom of the sediment)
- Not able to use geoprobe sampling system for groundwater sampling, glacial till is too dense/hard
- Temporary wells – Completed 2 attempts
  - Initial attempt at VP-103 constructed with 5 ft of coated bentonite chips above filter pack, but that wasn't creating a seal fast enough and had a lot of water running into the well. So, added grout above that and the grout improved the seal. Weather allowed for the well to sit overnight (drill rig has to stay in place entire time temporary well is in place); however, we were unsure after purging the well the next day that the sample was representative due to all the river water infiltration during well construction.
  - Second attempt seemed to work better at VP-102 (uncoated bentonite and grout was applied right away); however, after purged dry, recovery was really slow ~0.7 ft/hour. It was late in the day and weather allowed drill rig to sit overnight so was sampled the next morning. We are also

unsure that this sample is representative due to possible influence of drilling fluids, but are planning to run this sample since the seal did seem to be in place and we had slow recoveries. Also note that leaving the drill rig in place overnight is not always an option (weather dependent, need good weather).

- Denison soil sampler did not work for undisturbed soil sample. Split spoon sampler with 6 inch brass liners were used to get a sample at 1 location.
- Delays due to elevated PID readings during the drilling activities. The vapors were not coming from the borehole or soils and were not due to the drilling event activities; the readings were from an unknown source. Work was stopped 3 different times due to elevated readings and after further investigation with the Tyco facility and their lessee, it was determined to not be a source from the Tyco facility. Because the source and therefore mitigation measure to protect the field team could not be confirmed, the work was stopped for health and safety reasons and the team demobilized on 10/26

### **Path Forward**

The proposed path forward is to take the data we have gathered to date and prepare an interim memorandum with an evaluation of that data collected so far. Any proposed future activities, if needed, would be proposed in the interim memorandum.

Please let us know if you have any questions.

Thanks,

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**From:** Dodds, Jennifer <[dodds.jennifer@epa.gov](mailto:dodds.jennifer@epa.gov)>  
**Sent:** Monday, October 28, 2019 10:19 AM  
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**Subject:** [EXTERNAL] FW: Tyco - Arsenic Migrations Pathways Evaluation - Drilling Update and Proposed Changes

Heather,

Please provide an update on the conclusion of the in river sampling event including if you had determined an appropriate replacement approach for sample collection.

Thank you,

Jennifer Dodds

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**From:** Dodds, Jennifer  
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**To:** Ziegelbauer, Heather/MKE <[Heather.Ziegelbauer@jacobs.com](mailto:Heather.Ziegelbauer@jacobs.com)>  
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**Subject:** FW: Tyco - Arsenic Migrations Pathways Evaluation - Drilling Update and Proposed Changes

Heather,

EPA and WDNR have reviewed your October 18, 2019 Drilling Update and Proposed Changes email and have provided our comments below. Please let us know if you have any questions.

Thank you,

Jennifer Dodds  
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**From:** Ziegelbauer, Heather/MKE <[Heather.Ziegelbauer@jacobs.com](mailto:Heather.Ziegelbauer@jacobs.com)>  
**Sent:** Friday, October 18, 2019 4:53 PM  
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**Subject:** Tyco - Arsenic Migrations Pathways Evaluation - Drilling Update and Proposed Changes

Jennifer and Angie,

Here is an update on the drilling effort at the Tyco Fire Products LP site in Marinette. Wanted to update you on our progress and challenges we are encountering during this event.

- We had a late start this week due to lightning on Tuesday and had to stop work at VP-101 that

had only advanced 1 foot and on Wednesday completed no work because of high winds.

- Thursday we started at location VP-101 and collected split spoon samples from 0.0 to 3.0-ft below glacial till surface. We did not get a visual confirmation of bedrock in split spoon sampler: however 3-in split spoon was “bouncing,” then hollow stem auger was unable to advance, followed up with 2-in split spoon which also “bounced” and then abandoned the borehole.
- We set up at VP-102 next and collected split spoon samples from 0.0 to 6.1-ft below glacial till surface; taking about 4-hrs time. The last split spoon refused at 90+ blow counts at 0.4-ft. Split spoon sampling in the glacial till is time consuming and due to amount of gravel and cobbles, offsetting is not considered a viable option (would likely have same refusal); we also anticipate sampling time will be longer at depth due to harder material and longer core runs. With the slow going and repeated refusal, we attempted to collect the remaining samples with a rock core; we were able to tag bedrock, but unable to collect glacial till samples due to washout during the core advancement/retrieval. Bedrock at VP-102 was about ~12 -ft below glacial till surface at elevation 540.77. Samples were not obtained from 6.1 to 12 feet below the top of the glacial till at this location.
- Friday we set up at VP-103 with a new approach of using the Denison sampler to see if it proved better than the split spoon. The Denison made it into till about 0.3-ft then hit refusal. We are switching back to the split spoon sampling for now to see how it goes at VP-103 (anticipated to be similar to or more thickness than VP-102). The Denison sampler may still work for the geotechnical samples, based on discussions with the lab we need a minimum volume of 1-inch diameter and 6 inches long.

Items yet to try:

- Driller is bringing a soil core bit to use with the core barrel that may allow for the core approach to retrieve samples with these dense soils.
- Brass liner for split spoon could be used for Geotech samples if Denison sampler proves not to provide enough volume.

Based on our progress to date we would like to make the following immediate changes from our work plan:

- Initial estimates of glacial till material were thought to be 3 to 8 feet of thickness and we had proposed a 6-inch soil sample interval. In areas where there is greater than 6 feet of till thickness, a soil sample interval of 1 foot is proposed instead of the 6 inches. We believe this will provide sufficient data for our vertical soil concentration profiles. **EPA and DNR have no objection to the proposed change in sample interval.**
- With the hardness of the glacial till, the driller does not think the Geoprobe sampling system will work for collecting groundwater samples. Therefore instead of collecting groundwater samples every 2 feet, we are proposing to instead collect groundwater samples at up to two depth intervals, if till thickness allows, using a temporary well (1 inch diameter PVC well, with filter pack and bentonite seal to the top of till, would let sit for bentonite to hydrate for about 30 minutes to create a seal and then sample). One depth interval would be at the bottom of the borehole above bedrock and one at the midpoint interval of the glacial till. At some locations (like VP-101), due to limited till thickness, only 1 sample will be able to be collected. **We understand the requested change. We are concerned that the well may not exclude surface water and that the collected sample may not be representative of ground water.**

Possible Concerns/Changes:

- The glacial till material that has been pulled does not appear to be saturated and we are concerned that no or very minimal groundwater will be produced and there won't be enough volume for a sample. We should be able to confirm this after the first temporary well location attempt. EPA and DNR does not necessarily agree with the consultants observation that the till material is unsaturated.
- We are looking at other options for the collection of samples but may not find an appropriate replacement approach. EPA and DNR would encourage an alternative drilling approach using equipment more suitable for the site characteristics.

Overall so far what we have found is good, in that the glacial till is thicker than anticipated in some areas and it is very dense and not fully saturated. See comment above on the opinion with respect to the saturation of the till. However, because these soils are so dense, we are not able to move forward as proposed in the work plan and need to make adjustments and may need additional adjustments depending on how things go the rest of the day today and possibly tomorrow.

Please let us know if you have any questions and if you are ok with the changes in the 3<sup>rd</sup> set of bullets (proposed immediate changes) that we have proposed.

Thanks,

Heather Ziegelbauer, PE\*

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