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Department	Environmental, Health & Safety
From	Scott Detwiler
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Date	May 15, 2022

VIA E-MAIL TO: WojciechowskiK@Michigan.gov

Kevin Wojciechowski, Project Manager
Warren District Office Remediation and Redevelopment Division
Michigan Department of Environment, Great Lakes, and Energy
27700 Donald Court
Warren, Michigan 48092

RE: ZF Active Safety Systems Inc. (ZF) response to Michigan Department of Environment, Great Lakes, and Energy Comments Regarding ZF's Well Rehabilitation and Vertical Aquifer Profiling Work Plan submitted on April 22, 2022.

Dear Mr. Wojciechowski,

On May 4, 2022, the Department of Environment, Great Lakes, and Energy (EGLE) sent a response to ZF Active Safety Systems Inc. ("EGLE's May 4th Letter") regarding the Well Rehabilitation and Vertical Aquifer Profiling Work Plan submitted by ZF on April 22, 2022 (the "Work Plan"). The Work Plan was submitted by ZF in connection with EGLE's April 14, 2022 Letter in Response to Additional Information for Consideration Related to the Administrative Order for Response Activity, EGLE Docket No. AO-RRD-22-001 ("EGLE's April 14th Letter"). The purpose of this letter is to provide a response to each of the recommendations, comments, or questions included in EGLE's May 4th Letter.

1) EGLE Comment/Recommendation No. 1:

The plan calls for a down-well camera survey before rehab activities are performed but does not require a similar survey at other points such as after cleaning with a nylon brush or after the application of Aqua-Clear® PFD. Comparison of the original survey to later surveys would be useful to inform next steps as well as revealing improvements in condition of the well or conditions which were not previously observable and could be a concern.

ZF Response:

ZF/Arcadis plans to have a down-well camera onsite during the Monitoring Well OW-16D2 rehabilitation activities and intends to conduct periodic surveys of the well during and after well rehabilitation. ZF/Arcadis will also document the conditions of the well before and after significant steps in the rehabilitation process. ZF/Arcadis will perform a down-well camera survey after the well has been cleaned and, if applicable, after the injection of the Aqua-Clear® PFD. As noted in the work plan, a video recording of each of the down-well camera surveys will be created.

2) EGLE Comment/Recommendation No. 2:

Can any additional information be provided regarding what conditions from the well camera survey and chemical/biological results will trigger the use of Aqua-Clear® PFD?

ZF Response:

As indicated in the Work Plan, the chemical/biological sampling results will be used to assess biological and chemical factors (biofouling, scaling, etc.) for a complete well profile and the down-well camera survey will assess potential damage to the casing or the screen and will help determine if there is scaling, bioaccumulation on the well screen. If the results of the chemical/biological analysis and camera survey indicated that the poor hydraulic connection of OW-16D2 to the aquifer is likely related to mineral scaling/biofouling or deterioration of the well casing and/or screen, the use of Aqua-Clear®PFD would not be recommended and only mechanical redevelopment techniques including a combination of surging, swabbing, brushing and sediment removal via bailing, air lifting, and/or pumping would be utilized to address the condition of the well. However, the use of Aqua-Clear®PFD would be recommended if the poor hydraulic connection of OW-16D2 to the aquifer appears to be related to sediment and clay plugging the well screen/formation. The microscopic evaluation, which is part of the chemical/biological analysis, can help identify the types of sediment (clay/silt/sand) present in a sample and therefore, verify if the use of Aqua-Clear®PFD is appropriate and further guide recommendations on concentration and number of applications.

3) EGLE Comment/Recommendation No. 3:

Regarding the process for Aqua-Clear PFD:

- A. The work plan states that following introduction of the solution the well will sit for 4 hours. However, the manufacturer recommendation is that the well should be agitated every 2 hours. Why is there a deviation from the manufacturer's recommendations?
- B. Will the water level in the well be monitored during this work?
- C. If there is insufficient recharge of the well, what measures will be taken to remove and rinse the solution out of the well/gravel pack/formation?
- D. Has the manufacturer been contacted regarding potential reactions with vinyl chloride, cis-1,2-DCE, or other chlorinated and PFAS compounds?

ZF Response:

- A. *During the initial redevelopment of OW-16D2 that was conducted on April 1, 2022, most of the water was removed from the well during the process and recovery of groundwater into the well was very slow. Because this initial surging did not significantly improve the hydraulic connection of the well to the aquifer, Arcadis's senior hydrogeologist recommended that the Aqua-Clear®PFD sit for approximately 4 hours to provide time for the dispersant to react with the sediment before conducting surging. The manufacturer's recommendations also specify a longer treatment time (up to 24 hours) for mud rotary well installation to disperse drilling mud introduced during the drilling process. OW-16D2 was installed using hollow-stem auger drilling methods without the use of drilling mud. However, the Village of Milford has requested that ZF/Arcadis complete the work on OW-16D2 in less than 8 hours, between 10:00pm and 6:00 am. Therefore, given the slow recovery of OW-16D2 at the time of the initial well rehabilitation work and the time limits on conducting the work, ZF/Arcadis believes that 4*

hours is the minimum amount of time necessary to allow the Aqua-Clear®PFD to react with any sediment that is present and then begin surging. However, if EGLE would prefer that the well be agitated every 2 hours per the manufacturer's recommendation, ZF/Arcadis will implement that procedure.

- B. ZF/Arcadis plans to monitor the water level in the well during the well rehabilitation process. The water level will also be measured before starting the work to rehabilitate OW-16D2 and after the rehabilitation work is completed.
- C. According to the manufacturer's specifications and instructions, a well that has been treated with Aqua-Clear®PFD is considered purged of the additive when the water is clear and there is no turbidity. ZF/Arcadis proposes to surge the well and extract the water, while measuring turbidity and field parameters using a multiparameter instrument and a stand-alone turbidity meter. If the recharge is insufficient, redevelopment will be completed in surge and re-charge cycles until the turbidity clears up to pre-additive measurements.
- D. Arcadis contacted the manufacturer regarding potential reactions of Aqua-Clear®PFD with chlorinated volatile organic compounds (VOCs) and per- and polyfluoroalkyl substances (PFAS). The manufacturer indicated that they do not expect any reactions with chlorinated VOCs or PFAS and also stated that Aqua-Clear®PFD is a dispersant and only reacts with mud, sediment, and clay.

4) EGLE Comment/Recommendation No. 4:

The zone of "highest contamination" was not defined in EGLE's previous communication with ZF. The zone of "highest contamination" is defined by EGLE as the zone of the highest detected vinyl chloride, or if no vinyl chloride is detected, as the zone with the highest total VOCs. In a scenario where the highest vinyl chloride detected is in a different zone than highest total VOCs, ZF should meet with EGLE to discuss the placement of the well screen(s).

ZF Response:

Regarding the vertical aquifer profiling (VAP) work, ZF acknowledges and accepts EGLE's definition of "zone of highest contamination" to be the zone of the highest detected vinyl chloride, or if no vinyl chloride is detected, as the zone with the highest total VOCs. If the highest concentration of vinyl chloride detected is in a different zone than the highest total VOCs, ZF will contact EGLE to discuss the placement of well screen(s).

5) EGLE Comment/Recommendation No. 5:

The stated maximum depth of VAP borings is 130-feet below grade or to the surface of the clay underlying the aquifer. The VAP borings should be advanced 5 feet into the clay that is encountered at the bottom of the aquifer.

ZF Response:

ZF acknowledges and accepts EGLE's request and will attempt to advance the VAP borings to 5 feet onto the clay that is encountered at the bottom of the aquifer.

6) EGLE Comment/Recommendation No. 6:

Slug tests, using a bailer methodology, are to be completed on OW-16D2. A pneumatic displacement method for this well would provide a greater displacement of water in OW-16D2 and therefore improved results. Use of a pneumatic slug test method is recommended.

ZF Response:

ZF acknowledges EGLE's recommendation of using a pneumatic displacement method for slug tests at OW-16D2. Although an initial slug test was completed using the bailer methodology, ZF will use a pneumatic slug test method for future testing at OW-16D2.

7) EGLE Comment/Recommendation No. 7:

What is the reasoning for not collecting VOC samples during the chemical and biological analysis of monitoring well OW-16D2?

ZF Response:

The sampling procedures for the chemical and biological analysis do not meet the requirements for low-flow sampling that are required for collecting samples for VOC analysis. In addition, VOC samples were collected from OW-16D2 in April, will be collected again in May, and monthly thereafter, using the low-flow sampling techniques.

8) EGLE Comment/Recommendation No. 8:

Testing of two water samples mentions microscopic evaluations. What specific microscopic evaluations are to be completed?

ZF Response:

The microscopic evaluations include examination of a portion of the water samples (centrifuged to concentrate sediment) using a compound microscope at different magnifications from 100x to 1,000x. As indicated above, the microscopic evaluation, which is part of the chemical/biological analysis can help identify the types of sediment (clay/silt/sand) present in the sample and approximate particle sizing. This evaluation is also useful for identification of the types of bacterial activity (e.g., iron-oxidizing and/or sulfur reducing), scale accumulation (e.g., presence of calcium carbonate), formation influence, and corrosion by-products. The microscopic evaluation is also used to corroborate findings of the chemical/biological laboratory analysis such as oxidation-reduction potential.

9) EGLE Comment/Recommendation No. 9:

Testing is also being completed for total and E. coli coliform bacterial analysis. The monitoring well is not being disinfected, is bacterial analyses appropriate for OW-16D2?

ZF Response:

Total and E. coli coliform bacterial analysis are included in the complete well profile under the chemical/biological analysis, hence it was listed in the Work Plan. However, since OW-16D2 is not a potable water source, this testing is not necessary and will not be included in the analysis.

10) EGLE Comment/Recommendation No. 10:

What is the reason the VAP drilling is not occurring until June?

ZF Response:

The schedule for the VAP drilling is based on the availability of drilling companies. ZF/Arcadis would like to conduct the VAP work as soon as possible and have asked the drilling company to notify us if there are any openings in their schedule prior to June. Recent discussions indicate that the VAP work could start in May. However, this will also be dependent on coordination with the Village of Milford, as certain areas of Milford's Central Park will need to be closed-off during the performance of the work.

The Work Plan outlines the activities that ZF will perform to further investigate and rehabilitate Monitoring Well OW-16D2, conduct VAP, and potentially replace Monitoring Well OW-16D2 with a new well. In consideration of EGLE's comments and recommendations for the Work Plan, ZF's responses contained in this letter, and further discussions with EGLE, the Work Plan will be updated accordingly and resubmitted to EGLE.

Thank you for your attention to these matters and please include this letter in the administrative record for the AO and the Site.

If you have any questions, please contact me at the phone number listed in the header on the first page of this letter, Mr. Robert Bleazard – ZF Sr. EHS Manager, Environmental Remediation at 480-722-4866, or Mr. John McInnis of Arcadis at 248-994-2285.

Sincerely,



Scott Detwiler

Sr. Regional Manager
ZF Environmental, Health and Safety

cc: Christian Wuerth, Village of Milford
John McInnis, Arcadis
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