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GOVERNOR

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
GRAND RAPIDS DISTRICT OFFICE



C. HEIDI GREETHER
DIRECTOR

August 9, 2018

VIA E-MAIL AND U.S. MAIL

Mr. Dave Latchana
Wolverine World Wide, Inc.
9341 Courtland Drive, NE
Rockford, Michigan 49351

Dear Mr. Latchana,

SUBJECT: Per- and Poly-fluoroalkyl Substances (PFAS) Investigation Response
Alternate Water Supply Management Plan
Department of Environmental Quality (DEQ) Comments on Wolverine
World Wide, Inc. (Wolverine) May 15, 2018, Response
Kent County, Michigan

Staff from the Department of Environmental Quality (DEQ), Remediation and Redevelopment Division have reviewed the “Wolverine World Wide, Inc. – POET O&M” and “Aguasana 5300+ Point-of-Use Filtration Maintenance” letters prepared by Rose & Westra, a Division of GZA (R&W), dated May 15, 2018, and the attached “Alternate Water Supply Management Plan, Point-of-Entry Treatment Systems, Wolverine Worldwide, Inc.” prepared by R&W, dated Revised May 15, 2018” (Plan). The letters and Plan are responses to the DEQ April 3, 2018, letter requesting revision of the original January 16, 2018, Plan. The letters referred to the requested revisions as Bullet Points (BP) 1. BP-1 through 1. BP-8 for the General Plan Comments, the numbers 2 – 19 for Section specific requests, and 20. BP-1 through BP-5 for Appendix A requests. For clarity, the DEQ will use the same nomenclature to again request revision of said Plan, as follows:

1. General Plan Comments:

- BP-1 - The DEQ disagrees with the statement “Because there is no regulated public health risk for concentrations below 70 ppt for PFOS+PFOA, your request to notify the MDEQ and health agencies of any detection of PFOS+PFOA in the effluent samples is not necessary to protect public health”. The DEQ is again requesting the reporting of any Perfluorooctanoic Acid (PFOA)/Perfluorooctane Sulfonate (PFOS) detections in whole house filter effluent samples, and/or in any mid-stage samples with detections above 35 parts per trillion (ppt) to the DEQ,

Kent County Health Department, and Department of Health and Human Services within 24 hours upon receipt of the laboratory analysis including response actions to immediately abate potential public health risks.

- BP-2 - The DEQ requested the inclusion of Point of Use Treatment Systems (POUs) in the Plan. Wolverine instead chose to submit the "Aquasana 5300+ Point of Use Filtration Maintenance" letter to address the operation and maintenance of the POUs. The DEQ has no comments on the POU letter.
- BP-3 - Provide the DEQ requested contingency plan (with defined action levels) to implement when Point of Entry Treatment Systems (POETs) and POUs are down for maintenance and/or residents are waiting for maintenance to occur on their filter system. This contingency must be protective and include immediate access to bottled water. Wolverine responded that situations requiring implementation of the contingency plan were "unlikely", but did not rule out the possibility that they could occur.
- BP-4 - Include provisions to ensure operation of the ultra-violet (UV) lamp if back up power is in use. The POET uses a design that relies on UV light for filtered water disinfection. This light is powered by electricity and may not be operational during electrical power outages. Some residents may use back-up generators during power outages to operate their well pump and the Plan does not specify a provision to ensure operation of the UV light in this situation.

The DEQ disagrees with the Wolverine response that "...a temporary or even permanent interruption of the UV system does not pose a risk to health"

The source water bacteriological water quality is unknown and a moving target. Even if wells tested non-detect initially, they can become contaminated in a number of ways. Compared to a home without treatment, a granular activated carbon (GAC) filter provides an excellent medium for bacteriological attachment and growth if exposure occurs. Bacteriological contamination poses an acute health risk. The management plan should include flushing of the household plumbing following a power outage or any interruption of the UV system because some water will pass through without disinfection.

During a July 25, 2018, meeting, Mr. Bryan Rose with R&W indicated he would submit to the DEQ information from studies by the U.S. Environmental Protection Agency (USEPA) and Whole House Filter (WHF) evaluating the bacteriological risks from the filter systems as well as information regarding the operation of the UV lamp during interruptions in operation. Following review of the submittals, the DEQ may provide recommendations for bacteriological testing, if warranted.

- BP-5 - Specify removal of POETs and POUs by Wolverine at Wolverine's expense (i.e. if/when a residence is connected to a municipal water supply).

During the July 25, 2018, meeting, the DEQ and R&W discussed including in the Plan provisions to leave systems in place, if requested by the owner.

- BP-8 - Provide the minimum amount of empty bed contact time (EBCT) needed to obtain effective removal of PFAS compounds, including the supporting documentation. Wolverine has responded that the “minimum amount of EBCT is unknown”. The proposed 4-minute time seems low, and the minimum time needed depends on PFAS concentration and competing adsorbents in the water. The amount of media may need to be increased if the calculated EBCT proves insufficient.

During the July 25, 2018, meeting, R&W agreed to include in the Plan the assumptions and calculations used as the basis to develop mid-stage breakthrough time estimates and the filter system designs for the anticipated contaminant loading and flow rates.

2. Section 1.2:

Include a section for predictive filter performance monitoring. How are the filters performing over time and can flow/use, contaminant loading, and water fouling information be used over time to make some future predictive filter decisions that are protective? The Plan does include some predictive information regarding the UV lamp and water hardness.

During the July 25, 2018 meeting, R&W agreed to include in the Plan the assumptions and calculations used as the basis to develop mid-stage breakthrough time estimates and the filter system designs for the anticipated contaminant loading and flow rates.

3. Section 4.1:

Specify the protocol to measure and monitor water use volume as well as the decision protocol for installation of multiple POETs.

The response indicates that the Section 5.2 protocol to document the flow meter volume at each property during each inspection/maintenance and performance monitoring event will be used to measure water use. However, the response also states that “There are no plans to monitor the water use, and it should not be necessary”, an apparent contradiction. The response also states that “if it is determined that the user requires more than 8 gpm, a four column GAC system will be installed...”. It is not clear how the more than 8 gallons per minute (gpm) requirement will be determined.

During the July 25, 2018, meeting, R&W agreed to include in the Plan the assumptions and calculations used as the basis to develop mid-stage breakthrough time estimates and the filter system designs for the anticipated contaminant loading and flow rates.

4. Section 4.2:

Include provisions to estimate the pressure loss of the entire POET (pre and post filter, main filter, UV, etc.). The proposed system is intended to be simple and not require additional pumping. In some cases, the existing well pump flows and pressures may not be sufficient with the added losses. Is there a potential to create an acute health risk with pressure loss?

The response states that "In several cases, we have increased the pressure at the well pump delivery system to compensate for the increased pressure loss."

Increasing "the pressure at the well pump delivery system..." means the pump's duty point moves to the left on the curve. That results in lower flow rates and less efficiency. Therefore, a pump test with sustained high demands to ensure the well pump and storage can handle the added head is recommended at start up. If the treatment system causes a home to periodically lose water pressure, then we are trading a chronic public health risk for a potential acute risk.

During the July 25, 2018, meeting, R&W indicated that Wolverine will likely agree to include language in the Plan stating that Wolverine will address pressure loss/low flow issues as they arise.

5. Section 4.3, 13. Section 6.1.3.1, and 17. Section 6.1.6:

Include provisions for proper management of purge water that contains PFOA/PFOS at concentrations in excess of 70 ppt.

During the July 25, 2018, meeting, it was determined that the purge water would be adequately treated to reduce concentrations below 70 ppt; therefore, it may be appropriate to discharge the water to "the drain", as proposed.

6. Section 4.4:

Specify provisions for removal and proper management of all POET components, using qualified personnel, upon POET end of life or when the POETs are no longer determined necessary. The POETs will contain elevated PFAS compounds and the UV lamps contain mercury. As such, removal and management of all POET components should not be conducted by a homeowner.

7. Section 5.3:

Specify the pressure differential that would warrant filter replacement. As written, the Plan specifies pre- and post-filter replacement every 4 months and collection of pressure differential measurements. While it is encouraging that "no observations have been made to suggest the 4-month filter replacement should be revised", the differential triggering replacement should be established.

During the July 25, 2018, meeting, Mr. Rose indicated that Wolverine will likely agree to include language in the Plan stating that Wolverine will address low flow issues as they arise, instead of utilizing a pressure differential trigger value to indicate pre- and/or post-filter maintenance or replacement is needed.

8. Section 5.4:

Specify how GAC units will be changed out when multiple POETs are installed.

Please include the language in the response in Section 5.4 of the Plan. Include the filling and backwash procedures requested in 20. BP-4.

12. Section 6.1.2:

Include effluent bacterium testing post UV treatment. This is to ensure that the UV system is maintaining microbiological safety of the water in the POETs.

The DEQ recognizes that UV is being provided as a precaution. However, bacti testing is still justified downstream of the treatment unit for three reasons. First, the source water bacteriological water quality is unknown and a moving target. Even if wells tested non-detect initially, they can become contaminated in a number of ways. Second, compared to a home without treatment, a GAC filter provides an excellent medium for bacteriological attachment and growth if exposure occurs. Third, bacteriological contamination poses an acute health risk. The management plan should include flushing of the household plumbing following a power outage or any interruption of the UV system, because some water will pass through without disinfection.

During the July 25, 2018, meeting, Mr. Rose indicated he would submit to the DEQ information from studies by the USEPA and WHF evaluating the bacteriological risks from the filter systems as well as information regarding the operation of the UV lamp during interruptions in operation. Following review of the submittals, the DEQ may provide recommendations for bacteriological testing, if warranted.

14. Section 6.1.3.2:

- BP-1 - Specify what actions will be implemented if detections are recorded at the mid-point (between lead and lag filters) or effluent.

If effluent results are greater than 14 ppt PFOS+PFOA and rising, the lead and lag vessels should be changed out, and not just considered for change out.

- BP-2 - Define the rationale for the influent, mid-point and effluent sample points based on concentrations ranges of 1-70 ppt, 71-1000 ppt, 1001-7499 ppt and greater than 7500 ppt. Currently, the Plan includes provisions to only collect effluent samples for POETs when water concentrations are at least 1001 ppt in the source water. Effluent samples should also be collected from POETs or POU's when PFOA/PFOS concentrations in water are greater than 70 ppt to verify that the filter system is operating effectively. Increase the frequency of influent and mid-point samples to quarterly for situations where concentrations of PFOA/PFOS in water are present at concentrations greater than 1 ppt and less than 70 ppt. Modification of sample frequency is intended to evaluate potential seasonal influent changes and mid-point filter performance. The DEQ

will consider modification of the sample frequency after review of the first year of filter performance data.

During the July 25, 2018, meeting, R&W agreed to include in the Plan the assumptions and calculations used as the basis to develop mid-stage breakthrough time estimates and the filter system designs for the anticipated contaminant loading and flow rates.

15. Section 6.1.3.3:

Please explain that only effluent from POETs will be sampled during carbon change-out events. This is followed by the statement that if the carbon change-out was related to iron fouling that effluent sampling will not be completed. The Plan further indicates that change-out events will be scheduled prior to predicted breakthrough of the lead GAC vessel. Vessel breakthrough is defined as PFOA+PFOA greater than 35 ppt. GAC breakthrough should consider all the potential PFAS compounds. Provisions should also be included to evaluate whether other PFAS compounds negatively affect the performance or life expectancy of GAC units, POETs, or POU. Similarly, provisions should be included to evaluate whether total dissolved solids, hardness, or other water chemistry constituents negatively affect filter performance and life expectancy.

During the July 25, 2018, meeting, R&W agreed to include in the Plan the assumptions and calculations used as the basis to develop mid-stage breakthrough time estimates and the filter system designs for the anticipated contaminant loading and flow rates.

The DEQ will not agree with modifying the Plan to require weekly sampling for homes with PFOS+PFOA above 30,001 until it has reviewed the first year of filter performance data, as stated previously.

18. Section 6.3.2:

Include provisions to provide monthly reports for POETs and POU to the DEQ within 14 days from the end of each month. Periodic reports should also include filter installed date, dates sampled, results received, electronic data deliverables (EDD), and measured residential well pump capacities.

The DEQ and Wolverine are in discussion regarding the appropriate content for progress reports. The reporting should also include system layout descriptions and schematics to address the request in 20. BP-3.

20. Appendix A Installation and Operation Manual:

- BP-2 - When the media is replaced, Culligan indicates that the new media must soak in water for 24-48 hours before operation. This is consistent with the American Water Works Association (AWWA) Standard B604. The system should be designed so the lead filter can bypass the lag; and if possible, the media in only one filter at a time should be replaced. That way the owners

can still be provided PFAS free water for the 24-48 hours needed to soak new media.

Please include the discussion in the response regarding carbon de-gassing procedures in Section 5.4.

- BP- 5 - There is a safety warning that scalding water (up to 140 F) may accumulate in the system, if water sits in the UV portion of the POET system for an extended period of time. The period of time was not defined, and this warning along with the mercury lamp warning for the UV system should be explained to the residents.

The UV lamps will get hot especially in long periods when water is not passing through (nights, weekends, vacations, etc), or if they are dewatered. Do the UV units have an automatic high temperature shutoff to protect the lamps from overheating and for scalding safety? The May 15th response letter did not seem to provide a response to this concern.

Please explain how the scalding water warning will be provided to the residents.

Include the NSF- 61 verification in the Plan.

If you have any questions or concerns related to this request, please contact me at your earliest convenience at the Grand Rapids District Office, or at the information below.

Sincerely,



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cc: Ms. Sara Simmonds, Kent County Health Department
Mr. Bill Farrell, Michigan Department of Health and Human Services
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