



GRETCHEN WHITMER  
GOVERNOR

STATE OF MICHIGAN  
DEPARTMENT OF  
ENVIRONMENT, GREAT LAKES, AND ENERGY  
GRAND RAPIDS DISTRICT OFFICE



LIESL EICHLER CLARK  
DIRECTOR

June 4, 2019

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:** Wolverine World Wide, Inc. Per- and Polyfluoroalkyl Substances (PFAS) Response  
Drinking Water Well Resampling Summary and Request  
Kent County, Michigan

On March 21, 2019, the Michigan Department of Environment, Great Lakes, and Energy (EGLE), formerly the Michigan Department of Environmental Quality, received your report summarizing the results from the resampling of 62 residential wells in the House Street Study Area. The activities summarized in the March 21, 2019, document were completed in accordance with the work plan provided to EGLE on October 16, 2018. The October 16, 2018 work plan was provided as a counter proposal to EGLE's November 21, 2018 written resampling request that Wolverine World Wide, Inc. conduct a comprehensive resampling of all drinking water wells within Wolverine sampling areas. Additionally, on January 18, 2019, EGLE received a work plan for select residential well resampling in the Wolven/Jewell Study Area.

Based on review of the March 21, 2019, House Street summary report, the January 18, 2019, Wolven/Jewell work plan, and the October 16, 2018, House Street work plan, EGLE has several comments and pertinent questions:

1. While EGLE recognizes that PFAS results appear consistent with those from last year as summarized in the March 21, 2019, summary report, EGLE requests that detection limits be listed in the summary tables and reports, because different laboratories were used for analysis.
2. The technical approach presented in the October 16, 2018, work plan was utilized to determine which homes Rose & Westra, a Division of GZA (GZA) would resample. It is EGLE's position that this approach is not adequately supported or explained within the work plan or the March 21, 2019, summary report. In order to be protective of human health, and in lieu of resampling all remaining wells that do not have a whole house point of entry treatment system (WHF), Wolverine World Wide, Inc. (WWW) must provide a thorough evaluation of the initial hypotheses and methods used to determine which homes should be resampled within the House Street Study Area, including all supporting data. At a minimum, the following items need to be discussed and verified to provide the evidence to EGLE that the initial assumptions were verified, and that the same approach is appropriate to be applied to other sampling areas (i.e., Wolven/Jewell):

- a. Provide analytical data validating that the mole ratio of perfluorobutane sulfonic acid (PFBS) to perfluorooctane sulfonic acid (PFOS) + perfluorooctanoic acid (PFOA) is consistent for a specific product/waste stream.
  - b. Provide data tables, graphs, and scientific rationale for determining a mole ratio of PFBS to PFOS+PFOA of 0.65 in the House Street Study Area and a ratio of 0.10 in the Wolven/Jewell Study Area.
  - c. Explain the basis for why detections of PFOA and PFOS greater than 1,000 ng/L were excluded from GZA's evaluation, despite being closer in proximity to source areas. It is EGLE's opinion that the evaluation of groundwater contamination should also include detections of PFOA and PFOS greater than 1,000 ng/L.
3. Address and discuss the chemistry of PFAS that were used and disposed of by WWW. To our knowledge, perfluorooctane sulfonyl fluoride (POSF) was the key intermediate from which all PFOS-related products were subsequently produced prior to 2002. The 3M Company focused on POSF-based chemistry with PFOS and PFOS-precursors of eight carbon chain lengths as being the dominant PFAS used in their products. As a result, PFBS is believed to have been produced as an impurity and not a main PFAS compound. This is expected to have potentially resulted in variations to the PFBS present in each batch and over time. Therefore, using a PFBS to PFOS+PFOA mole ratio as a tracer for source identification may not be appropriate.
4. Discuss and support the statement that "as PFBS and PFOS+PFOA leach in groundwater and migrate, PFBS is expected to move faster than PFOS+PFOA."
  - a. Address the differences between the Perfluoroalkyl carboxylic acids (PFOA family) and Perfluoroalkane sulfonic acids (PFOS family), particularly concerning adsorption to soils. Assuming that both PFOA and PFOS will behave the same in the environment is not accurate. For example, there are many studies that show that PFOA adsorption to granular activated carbon is less than PFOS.
  - b. Provide graphics and figures with environmental and residential data that supports your hypotheses and include all supporting documentation.
5. Provide supporting tables, documentation, and information used to produce figures in the House Street and Wolven/Jewell work plans. EGLE would like to understand what monitoring wells and residential wells were considered when evaluating the interpolated PFBS isoconcentration map offered in Figure 2 of the work plans. The scientific rationale of using 5 ng/L for PFBS as plume delineation should be presented along with supporting tables and documentation.
6. For Figure 3 in the October 2018 House Street work plan and the January 2019 Wolven/Jewell work plan, please clarify how data above 1,000 ng/L for PFOA+PFOS were used when these figures were produced. EGLE would like to see figures that show the ratio of PFBS to PFOA+PFOS included within the aquifer both horizontally and vertically. Ratio figures should be used in addition to isoconcentration figures to evaluate the data and determine if ratios of these compounds can indeed be used to evaluate the entire plume migration.
7. Discuss and demonstrate the vertical extent of the plume in each of the study areas and how the geology and residential well screen depths may play a role in the resulting isoconcentration figures. The use of geological data is necessary for evaluation and interpretation of plume migration that may affect public health and the environment.

EGLE requests the above information be provided to the Department within 30 business days of receipt of this letter.

The information provided so far by Wolverine World Wide, Inc. is insufficient to support a deviation from EGLE's November 21, 2018, sampling request. Unless EGLE is provided with strong scientific documentation and the information requested above to convince it otherwise, the November 21, 2018, request for WWW to conduct a comprehensive resampling of all drinking water wells within Wolverine sampling areas remains valid. EGLE views this resampling as a necessary response action to protect public health.

If you have any questions regarding this letter, please contact me or Ms. Karen Vorce, at the Grand Rapids District Office, Remediation and Redevelopment Division, at 616-356-0500; HendershottA@michigan.gov or VorceK@michigan.gov; or EGLE Grand Rapids District Office, 350 Ottawa Avenue, NW, Unit 10, Grand Rapids, Michigan 49503-2341.

Sincerely,



Abigail Hendershott  
District Supervisor  
Grand Rapids District Office  
Remediation and Redevelopment Division  
616-888-0528

cc: Ms. Polly Synk, Department of Attorney General  
Mr. Steve Sliver, MPART Executive Director, EGLE  
Ms. Susan Leeming, EGLE  
Ms. Kathleen Shirey, EGLE  
Ms. Karen Vorce, EGLE  
Mr. Dan Yordanich, EGLE