

November 21, 2017

Mr. Gary Hohenstein
Manager, Environmental and Regulatory Affairs
3M Center
Building 0224-05-W-03
St. Paul, MN 55144-1000

RE: Drinking Water Health Advisory for Cities of Woodbury and Oakdale Municipal Wells

Dear Mr. Hohenstein:

As you are aware, the Minnesota Department of Health (MDH) has developed new Health Based Values (HBVs) for perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS). These new HBVs are 35 parts per trillion (ppt) for PFOA and 27 ppt for PFOS.

Based on the development of these new HBVs, MDH has recently issued a Notice of Health Risk Advisory to each of the Cities of Woodbury and Oakdale for the levels of perfluorochemicals (PFCs) found in each of the City's wells. (See enclosed)

Under the terms of Part VIII.B. of the May 22, 2007 Settlement Agreement and Consent Order (Consent Order) between 3M Company (3M) and the Minnesota Pollution Control Agency (MPCA), 3M is obligated to implement response actions "including construction, installation, replacement, and operation and maintenance, that are reasonable and necessary to provide alternative sources of drinking water for all persons whose drinking water is contaminated with PFCs in a concentration that exceeds an HBV or Health Risk Limit (HRL) issued or adopted by the Minnesota Department of Health, including water containing two or more PFCs for which HBVs or HRLs have been adopted if the combined PFC levels exceed a Hazard Index of 1.0 based on those HBVs or HRLs and MDH has issued an advisory against human consumption of the water."

As noted earlier, MDH has issued such an advisory to each City. Therefore, the MPCA is requesting, under the Consent Order and other applicable state law, that 3M coordinate with each city to evaluate the impacts of PFC concentrations in the drinking water supply and undertake appropriate response actions as approved by the MPCA to address the impacted municipal water supplies for the cities of Woodbury and Oakdale.

Given the importance of this issue, the MPCA requests that **by no later than December 6, 2017**, 3M inform the MPCA as to whether 3M will initiate the requested actions under the Consent Order and provide a schedule for implementation of the requested actions.

**Exhibit
2692**

State of Minnesota v. 3M Co.,
Court File No. 27-CV-10-28862

Mr. Gary Hohenstein
Page 2
November 21, 2017

If you have any questions about this matter, please contact Gary Krueger of my staff at 651-757-2509 or by e-mail at gary.krueger@state.mn.us.

Sincerely,



Kathryn J. Sather
Division Director
Remediation Division

KJS/bhj

cc: Clinton Gridley, Woodbury City Administrator
Bart Fischer, Oakdale City Administrator
Tom Hogan, Minnesota Department of Health
James Kelly, Minnesota Department of Health
Jean Sweeney, 3M Company



Minnesota
Department
of Health

PROTECTING, MAINTAINING & IMPROVING THE HEALTH OF ALL MINNESOTANS

November 20, 2017

Mr. Clinton Gridley, Administrator
City of Woodbury
8301 Valley Creek Road
Woodbury, MN 55125

Subject: Notice of Health Risk Advisory for Perfluorochemicals (PFCs)

Dear Mr. Gridley:

I am writing to notify you of important findings related to the Woodbury drinking water system. Specifically, the Minnesota Department of Health is issuing a Notice of Health Risk Advisory for Woodbury wells 1, 6, 7, 9, and 13. Please note that we have been in ongoing discussions with your city water officials regarding this issue, beginning in August of 2016 and again in May of 2017, and will continue to support you in your efforts to implement corrections.

Based on recent review of information related to health effects and exposure for two man-made chemicals called Perfluorooctanoic acid (PFOA) and Perfluorooctane sulfonate (PFOS), MDH has developed new Health-Based Values (HBVs) for the chemicals. As you may know, MDH scientists develop HBVs to provide decision-makers with useful reference points for determining how to respond when the chemicals are found in groundwater or in drinking water. The updated values are 0.035 µg/L for PFOA and 0.027 µg/L for PFOS. In addition, MDH uses the HBV for PFOS (0.027 µg/L) as a stand-in (or "surrogate") for Perfluorohexane sulfonate (PFHxS), since PFHxS remains in the body longer than PFOS and appears to have similar toxicity. These new HBVs take into account recent scientific findings regarding the risk of adverse developmental effects to fetuses during pregnancy or to breast-fed infants - the groups most sensitive to potential harmful effects of Perfluorochemicals (PFCs).

Because each of these chemicals can cause similar health effects, Minnesota Administrative Rules section 4717.7880 requires that when a combination of PFOA, PFOS, PFHxS, Perfluorobutanoic acid (PFBA), or Perfluorobutanesulfonate (PFBS) are found in drinking water, the state should calculate a health risk index (HRI) to determine if the combined health risk exceeds a level of concern. Information about how this health risk index is calculated is attached and can be found in Minnesota Administrative Rules section 4717.7880. A health risk index greater than 1.0 indicates an unacceptable health risk.

MDH staff reviewed the data from the four most recent water samples collected from each of Woodbury's wells, which had the following average PFC concentrations:

Woodbury Community Well PFC Sample Results – 4 sample average

Well Number	PFOS (ug/L)	PFOA (ug/L)	PFBA (ug/L)	PFBS (ug/L)	PFHxS (ug/L)	Health Risk Index
1	0.014	0.029	0.1525	ND	0.0015	1.42
2	ND	ND	0.215	ND	ND	0.03
3	0.0023	0.0093	0.1975	ND	ND	0.38
4	0.0038	0.019	0.2575	ND	0.0018	0.78
5	ND	0.0075	0.2325	ND	ND	0.25
6	0.023	0.042	0.40	ND	ND	2.11
7	0.023	0.041	0.38	ND	0.0023	2.16
8	ND	0.0015	0.28	ND	ND	0.08
9	0.0078	0.0268	0.305	ND	ND	1.09
10	ND	0.0048	0.2825	ND	ND	0.18
11	ND	0.0045	0.1725	ND	ND	0.15
12	ND	0.006	0.255	ND	ND	0.21
13	0.020	0.0068	0.335	ND	0.0545	3.00
14	ND	ND	0.25	ND	ND	0.04
15	ND	ND	0.1925	ND	ND	0.03
16	ND	ND	0.3175	ND	ND	0.05
17	ND	0.013	0.1625	ND	ND	0.39
18	ND	ND	0.091	ND	ND	0.01
19	ND	ND	0.16	ND	ND	0.02
HBV/HRL	0.027	0.035	7	7	0.027*	

ND = Not Detected

ug/L = micrograms per liter

Bold indicates health risk index exceeds 1.0

The results for Wells 1, 6, 7, 9, & 13 exceed the health risk index for the chemicals in question. As a result, MDH is issuing a Notice of Health Risk Advisory to the City of Woodbury. **MDH recommends that the City of Woodbury take action to reduce the PFC health risk index to below 1.0 in the management of its potable water supply.**

For questions about health concerns or more information about PFCs, contact the MDH Site Assessment and Consultation Unit at 651-201-4897 or health.hazard@state.mn.us. For technical assistance, please contact Lucas Martin, District Engineer, at 651-201-4144 or lucas.martin@state.mn.us.

Sincerely,

A handwritten signature in black ink, appearing to read "Tom Hogan", written in a cursive style.

Tom Hogan
Division Director
Environmental Health Division

Cc: Kathy Sather, Director, Remediation Division, Minnesota Pollution Control Agency

Enclosure: Health Risk Index Calculation

Health Risk Index Calculation

In many situations, a sample of groundwater contains multiple chemicals. MDH applies the procedure described in the Health Risk Limit (HRL) Rules (Minnesota Administrative Rules section 4717.7880) to evaluate exposure to multiple chemicals. This process is based on an additive model. The U.S. Environmental Protection Agency (EPA) also uses this model as a reasonable approach given what is unknown about how chemicals interact in the body.

- Chemicals that share a common health endpoint are evaluated together. Chemicals for which no health endpoint is specified are not included.
- For each chemical sharing a health endpoint, a ratio is calculated by comparing the groundwater concentration of the chemical to the exposure duration-specific health-based guidance for that chemical. The individual ratios are then added together. This process creates a number called a Health Risk Index (HRI).
- An HRI over one is considered an exceedance; similar to the concentration of a single chemical exceeding its respective Health-Based Value (HBV) or HRL.
- Below is an example of how MDH calculates the Health Risk Index for mixtures of Perfluorochemicals (PFCs) for which we have health-based guidance values:

$$\frac{XX \mu\text{g PFBA/L}^*}{\text{PFBA HBV}} + \frac{XX \mu\text{g PFBS/L}^*}{\text{PFBS HBV}} + \frac{XX \mu\text{g PFHxS/L}^*}{\text{PFHxS 'HBV'}^{**}} + \frac{XX \mu\text{g PFOA/L}^*}{\text{PFOA HBV}} + \frac{XX \mu\text{g PFOS/L}^*}{\text{PFOS HBV}} = \text{Health Index}$$

* Detected drinking water concentration

**use PFOS HBV as Interim substitute



Minnesota
Department
of Health

PROTECTING, MAINTAINING & IMPROVING THE HEALTH OF ALL MINNESOTANS

November 20, 2017

Mr. Bart Fischer, Administrator
City of Oakdale
1584 Hadley Avenue North
Oakdale, MN 55128

Subject: Notice of Health Risk Advisory for Perfluorochemicals (PFCs)

Dear Mr. Fischer:

I am writing to notify you of important findings related to the Oakdale drinking water system. Specifically, the Minnesota Department of Health is issuing a Notice of Health Risk Advisory for Oakdale wells 1, 2, 7, and 8. Please note that we have been in ongoing discussions with your city water officials regarding this issue, beginning in August of 2016 and again in May of 2017, and will continue to support you in your efforts to implement corrections.

Based on recent review of information related to health effects and exposure for two man-made chemicals called Perfluorooctanoic acid (PFOA) and Perfluorooctane sulfonate (PFOS), MDH has developed new Health-Based Values (HBVs) for the chemicals. As you may know, MDH scientists develop HBVs to provide decision-makers with useful reference points for determining how to respond when the chemicals are found in groundwater or in drinking water. The updated values are 0.035 µg/L for PFOA and 0.027 µg/L for PFOS. In addition, MDH uses the HBV for PFOS (0.027 µg/L) as a stand-in (or "surrogate") for Perfluorohexane sulfonate (PFHxS), since PFHxS remains in the body longer than PFOS and appears to have similar toxicity. These new HBVs take into account recent scientific findings regarding the risk of adverse developmental effects to fetuses during pregnancy or to breast-fed infants - the groups most sensitive to potential harmful effects of Perfluorochemicals (PFCs).

Because each of these chemicals can cause similar health effects, Minnesota Administrative Rules section 4717.7880 requires that when a combination of PFOA, PFOS, PFHxS, Perfluorobutanoic acid (PFBA), or Perfluorobutanesulfonate (PFBS) are found in drinking water, the state should calculate a health risk index (HRI) to determine if the combined health risk exceeds a level of concern. Information about how this health risk index is calculated is attached and can be found in Minnesota Administrative Rules section 4717.7880. A health risk index greater than 1.0 indicates an unacceptable health risk.

MDH staff reviewed the data from the most recent water samples collected from each of Oakdale's wells, which had the following PFC concentrations:

Oakdale Community Well PFC Samples Collected on August 23, 2017

Well Number	PFOS (ug/L)	PFOA (ug/L)	PFBA (ug/L)	PFBS (ug/L)	PFHxS (ug/L)	Health Risk Index
1	0.059	0.081	0.30	0.014	ND	4.54
2	0.041	0.072	0.24	ND	ND	3.61
3	ND	ND	0.11	ND	ND	0.02
7	0.35	0.30	1.1	0.022	0.046	23.4
8	0.27	0.20	0.54	0.017	0.015	16.35
10	ND	ND	0.041	ND	ND	0.01
HBV/HRL	0.027	0.035	7	7	0.027*	

ND = Not Detected

ug/L = micrograms per liter

Bold indicates health risk index exceeds 1.0

The results for Wells 1, 2, 7, & 8 exceed the health risk index for the chemicals in question. As a result, MDH is issuing a Notice of Health Risk Advisory to the City of Oakdale. **MDH recommends that the City of Oakdale take action to reduce the PFC health risk index to below 1.0 in the management of its potable water supply.**

For questions about health concerns or more information about PFCs, contact the MDH Site Assessment and Consultation Unit at 651-201-4897 or health.hazard@state.mn.us. For technical assistance, please contact Lucas Martin, District Engineer, at 651-201-4144 or lucas.martin@state.mn.us.

Sincerely,



Tom Hogan
Division Director
Environmental Health Division

Cc: Kathy Sather, Director, Remediation Division, Minnesota Pollution Control Agency

Enclosure: Health Risk Index Calculation

Health Risk Index Calculation

In many situations, a sample of groundwater contains multiple chemicals. MDH applies the procedure described in the Health Risk Limit (HRL) Rules (Minnesota Administrative Rules section 4717.7880) to evaluate exposure to multiple chemicals. This process is based on an additive model. The U.S. Environmental Protection Agency (EPA) also uses this model as a reasonable approach given what is unknown about how chemicals interact in the body.

- Chemicals that share a common health endpoint are evaluated together. Chemicals for which no health endpoint is specified are not included.
- For each chemical sharing a health endpoint, a ratio is calculated by comparing the groundwater concentration of the chemical to the exposure duration-specific health-based guidance for that chemical. The individual ratios are then added together. This process creates a number called a Health Risk Index (HRI).
- An HRI over one is considered an exceedance; similar to the concentration of a single chemical exceeding its respective Health-Based Value (HBV) or HRL.
- Below is an example of how MDH calculates the Health Risk Index for mixtures of Perfluorochemicals (PFCs) for which we have health-based guidance values:

$$\frac{XX \mu\text{g PFBA/L}^*}{\text{PFBA HBV}} + \frac{XX \mu\text{g PFBS/L}^*}{\text{PFBS HBV}} + \frac{XX \mu\text{g PFHxS/L}^*}{\text{PFHxS 'HBV'***}} + \frac{XX \mu\text{g PFOA/L}^*}{\text{PFOA HBV}} + \frac{XX \mu\text{g PFOS/L}^*}{\text{PFOS HBV}} = \text{Health Index}$$

* Detected drinking water concentration

**use PFOS HBV as interim substitute