MEMORANDUM

CITY OF ISSAQUAH WASHINGTON

TO: Senator Wellman

FROM: City of Issaquah

DATE: January 25, 2017

SUBJECT: PFAS Contamination and Recommended Action

I. Introduction

This memorandum provides background on the perfluorinated compounds (PFASs) family of environmental contaminants, describes steps the City of Issaquah has taken to remediate PFAS contamination to its water supply, outlines PFAS's current regulatory status in the United States and Washington, and describes potential steps the Washington Legislature could take to facilitate cleaning up PFAS contaminants in soil and groundwater. PFASs are chemicals used in a variety of consumer products and found worldwide in the environment, wildlife, and even humans. Studies have found that PFASs are associated with adverse health effects, and while federal and state agencies are assessing regulatory options for these chemicals, PFAS contamination is emerging as a troubling and relatively unaddressed phenomenon nationwide. Here in Washington, the City of Issaquah has discovered PFASs in its drinking water and has spent approximately $1 million to ensure safe drinking water for its citizens. PFASs have also been found in nearby Sammamish Plateau Water supply wells.

II. What are perfluorinated compounds?

PFASs are synthetic chemicals that have many useful properties, including fire resistance and oil, stain, grease, and water repellency.[1] The two most widely known PFASs are perfluorooctanoic acid (PFOA) and perfluorooctane sulfate (PFOS).[2] These chemicals are often found in cleaners, textiles, apparel, carpet, leather, paper, paints, firefighting foams, and wire insulation.[3]

Because of their widespread use and persistence in the environment (i.e., they do not degrade), PFASs are now found worldwide in the environment, wildlife, and humans.[4] In a Washington Department of Ecology (Ecology) study, PFASs were found in a wide range of environmental media in Washington, including surface water, wastewater treatment plant effluent, fish tissue, and osprey eggs.[5] In addition, according to industry

human biomonitoring data, PFOA is found in the blood of the general population in all geographic regions of the United States.[6]

III. Adverse Health Effects

Studies have shown that PFASs, specifically PFOA and PFOS, are associated with adverse health effects. Peer-reviewed studies on laboratory animals and epidemiological studies of human populations indicate that exposure to PFOA and PFOS over certain levels may result in adverse health effects, including developmental effects to fetuses during pregnancy or to breastfed infants (e.g., low birth weight, accelerated puberty, skeletal variations), cancer (e.g., testicular, kidney), liver effects (e.g., tissue damage), immune effects (e.g., antibody production and immunity), thyroid effects and other effects (e.g., cholesterol changes).[7]

IV. Drinking Water Contamination

Although PFASs are ubiquitous in low concentrations, they are of special concern in drinking water. Because PFASs do not easily degrade, they can accumulate, making consistent exposure to even low concentrations potentially problematic.[8]

PFAS contamination of drinking water has been discovered here in Washington. In January 2016, a New York Times Magazine story named Issaquah as one city impacted by PFOS contamination.[9] It was then revealed that one of the city's drinking water wells had tested above U.S. Environmental Protection Agency (EPA) advisory levels for PFOS since 2013.[10] The City of Issaquah has since spent over $1 million to treat the drinking water.[11] This cost does not include removing PFOS sources, which remain unremediated. PFOS has also been discovered in three Sammamish Plateau Water production wells[12] and in the main stem of Issaquah Creek.[13]

In addition to these local communities, PFAS contamination in drinking water can be found throughout the country. PFAS contamination is common on and around military installations and civilian airports due to the use of aqueous film-forming foams used to fight fires.[14] The U.S. Air Force has identified 200 facilities where there may be PFAS releases, many of which are now undergoing cleanup for contaminated drinking water.[15] More broadly, an August 2016 study found that the drinking water for at least 6 million U.S. residents contains PFASs in excess of EPA health advisory levels.[16]

V. Regulatory Status

PFASs are currently classified as "emerging" contaminants at both the federal and state levels, meaning there are no numeric standards for cleaning up PFASs in soil or water. Both federal and state agencies have begun to take actions to further regulate PFASs. As described below, however, that process is incomplete and there are additional steps EPA and Ecology could take under the respective federal and state regulatory schemes.

A. Federal

In the late 1990s, EPA received information indicating that PFOS in particular was widespread in the blood of the general population and presented concerns for

persistence, bioaccumulation, and toxicity.[17] Following discussions between EPA and 3M—the sole manufacturer of PFOS in the United States and the principal manufacturer in the world—the company terminated production of these chemicals in May 2000.[18] In 2002, EPA took action to limit future manufacture and importation of PFOS and took similar action in 2007 with regard to an additional 183 PFAS chemicals.[19] In addition, EPA's New Chemicals program reviews alternatives for PFOA and related chemicals before they enter the marketplace to ensure that replacement chemicals do not present an unreasonable risk to health or the environment.[20]

In May 2016, EPA established a drinking water health advisory for PFOA[21] and PFOS,[22] setting the advisory level at 70 parts per trillion. These advisories provide technical information to state agencies and other public health officials on health effects, analytical methodologies, and treatment technologies associated with drinking water contamination.

B. Washington

The Washington State Departments of Ecology and Health are developing a Chemical Action Plan (CAP) for PFASs.[23] A CAP generally includes an analysis of the chemistry, sources, health effects, and environmental data of the chemical at issue, as well as a regulatory and economic analysis coupled with recommendations.[24] An advisory committee[25] began meeting in January 2016 and is assisting with collecting information and identifying solutions.[26] The draft PFAS CAP is expected to be ready for public review and comment and then finalized in 2017.[27] Although the CAP process is important, it does not necessarily result in a substantive rule or policy change.

VI. PFAS and MTCA

In Washington, the Model Toxics Control Act (MTCA), Chapter 70.105D RCW, is the main mechanism for toxic waste cleanup. MTCA liability for cleanup only attaches to "hazardous substances," which are defined as:

1) "Dangerous waste" as defined by law or rule;
2) "Extremely hazardous waste" as defined by law or rule;
3) "Hazardous substances" as defined by law or rule;
4) Any hazardous substance under federal cleanup law;
5) Petroleum or petroleum products; and
6) Any substance determined by Ecology rule to present a threat to human health or the environment if released into the environment.[28]

PFASs arguably qualify as hazardous substances under one or more of these categories. However, Ecology has not yet formally treated PFASs as hazardous substances under MTCA. For example, "dangerous wastes" are defined as "any discarded, useless, unwanted, or abandoned substances…which are disposed of in such quantity or concentration as to pose a substantial present or potential hazard to human health, wildlife, or the environment because such wastes…have mutagenic, *teratogenic*,[29] or *carcinogenic*[30] properties."[31] As discussed above, peer-reviewed studies indicate that exposure to PFOA and PFOS may result in adverse health effects, including

developmental effects to fetuses during pregnancy and cancer.[32] This means that certain PFASs qualify as "dangerous waste" under current Washington law, even though Ecology has yet to formally regulate them as such.

VII. Potential Steps for the Washington Legislature

The Washington State Legislature could take one or more of the following steps to reinforce that PFASs are hazardous and to facilitate cleanup of these chemicals.

A. Amend MTCA to specifically include PFASs such as PFOA and PFOS in the definition of "hazardous substances;" or alternatively, pass a resolution requiring Ecology to do so in its regulations

This action would specifically include the desired PFASs directly in the definition of hazardous substances in either the statute or the regulations so that it is clear MTCA applies to them. While including a specific contaminant in the definition of "hazardous substances" would be unusual, it would not be unprecedented, as "petroleum or petroleum products" is included directly in the definition in both the statute and the regulations. Adding certain PFASs to the definition of "hazardous substances" would mean that MTCA liability would unquestionably apply to PFAS pollution, allowing those impacted by PFAS contamination to compel hazardous waste cleanups and more easily recover remedial action costs from responsible parties.

B. Pass a resolution recognizing the adverse health effects of PFASs and urging Ecology to recognize certain PFASs as hazardous under its current regulatory framework and to promulgate numeric cleanup standards

This action would not change the law, which as discussed above, is not required for PFASs to be considered hazardous in Washington. This step would detail the problems with PFASs, compel Ecology to read the current law and regulations to include certain PFASs, such as PFOS and PFOA, in the definition of hazardous substances, and compel Ecology to issue numeric cleanup standards, making it easier to cleanup PFAS contamination.

C. Meet with Ecology as to urge more assertive movement on PFASs

Topics discussed in this meeting could include: 1) health and environmental concerns surrounding PFASs; 2) a progress report on the PFAS CAP; 3) Ecology's position on PFASs as hazardous under MTCA as described above; and 4) the development of numeric cleanup standards.

---

[1] U.S. EPA, Per- and Polyfluoroalkyl Substances (PFASs) Under TSCA, https://www.epa.gov/assessing-and-managing-chemicals-under-tsca/and-polyfluoroalkyl-substances-pfass-under-tsca (last visited Jan. 10, 2017); Wash. Dep't of Ecology, Perflorinated Compounds in Washington Rivers and Lakes (Aug. 2010) at 9, *available at* https://fortress.wa.gov/ecy/publications/documents/1003034.pdf.

[2] Wash. Dep't of Ecology, Perflorinated Compounds in Washington Rivers and Lakes (Aug. 2010) at 9, *available at* https://fortress.wa.gov/ecy/publications/documents/1003034.pdf.

[3] U.S. EPA, Per- and Polyfluoroalkyl Substances (PFASs) Under TSCA, https://www.epa.gov/assessing-and-managing-chemicals-under-tsca/and-polyfluoroalkyl-substances-pfass-under-tsca (last visited Jan. 10, 2017).

[4] U.S. EPA, Per- and Polyfluoroalkyl Substances (PFASs) Under TSCA, https://www.epa.gov/assessing-and-managing-chemicals-under-tsca/and-polyfluoroalkyl-substances-pfass-under-tsca (last visited Jan. 10, 2017).

[5] Wash. Dep't of Ecology, What are PFASs?, http://www.ecy.wa.gov/programs/hwtr/rtt/pbt/pfas.html (last visited Jan. 10). *See also* Wash. Dep't of Ecology, Perflorinated Compounds in Washington Rivers and Lakes (Aug. 2010) at 9, *available at* https://fortress.wa.gov/ecy/publications/documents/1003034.pdf. This study is undergoing an update. *See* Wash. Dep't of Ecology, Quality Assurance Project Plan: Statewide Survey of Per-and Poly-fluoroalkyl Substances in Washington State Rivers and Lakes (Apr. 2016), *available at* https://fortress.wa.gov/ecy/publications/documents/1603110.pdf.

[6] Perfluorooctanoic Acid (PFOA), Fluorinated Telomers; Request for Comment, Solicitation of Interested Parties for Enforceable Consent Agreement Development, and Notice of Public Meeting, 68 Fed. Reg. 73, 18629 (Apr. 16, 2003) *available at* https://www.gpo.gov/fdsys/pkg/FR-2003-04-16/pdf/03-9418.pdf.

[7] U.S. EPA, Fact Sheet PFOA & PFOS Drinking Water Health Advisories (Nov. 2016) at 2, *available at* https://www.epa.gov/sites/production/files/2016-06/documents/drinkingwaterhealthadvisories_pfoa_pfos_updated_5.31.16.pdf. *See also* U.S. EPA, Health Effects Support for Perfluorooctane Sulfonate (PFOS) (May 2016), *available at* https://www.epa.gov/sites/production/files/2016-05/documents/pfos_hesd_final_508.pdf; U.S. EPA, Health Effects Support for Perfluorooctanoic Acid (PFOA) (May 2016), *available at* https://www.epa.gov/sites/production/files/2016-05/documents/pfoa_hesd_final_508.pdf.

[8] *See* U.S. EPA, Drinking Water Health Advisory for Perfluorooctanoic Acid (PFOA) (May 2016), *available at* https://www.epa.gov/sites/production/files/2016-05/documents/pfoa_health_advisory_final_508.pdf; U.S. EPA, Drinking Water Health Advisory for Perfluorooctane Sulfonate (PFOS) (May 2016), *available at* https://www.epa.gov/sites/production/files/2016-05/documents/pfos_health_advisory_final_508.pdf.

[9] Scott Stoddard, "Issaquah tap water meets all federal health guidelines; one of the city's wells does not, *The Issaquah Press* (Jan. 15, 2016), *available at* http://www.theeastside.news/issaquah/news/local/issaquah-tap-water-meets-all-federal-health-guidelines-one-of/article_09837cba-bbc1-11e5-b1ac-0f38b4aefa3a.html. *See also* Nathaniel Rich, "The Lawyer Who Became DuPont's Worst Nightmare," *The New York Times Magazine* (Jan. 6, 2016), *available at* https://www.nytimes.com/2016/01/10/magazine/the-lawyer-who-became-duponts-worst-nightmare.html?action=click&contentCollection=Opinion&module=RelatedCoverage&region=EndOfArticle&pgtype=article.

[10] Scott Stoddard, "Issaquah tap water meets all federal health guidelines; one of the city's wells does not, *The Issaquah Press* (Jan. 15, 2016), *available at* http://www.theeastside.news/issaquah/news/local/issaquah-tap-water-meets-all-federal-health-guidelines-one-of/article_09837cba-bbc1-11e5-b1ac-0f38b4aefa3a.html.

[11] Tom Corrigan, "Issaquah City Council approves $988,000 for filtering and studying well water system, *The Issaquah Press* (Apr. 6, 2016), *available at* http://www.theeastside.news/issaquah/news/local/issaquah-city-council-approves-for-filtering-and-studying-well-water/article_4a18068c-fc31-11e5-9b71-27484799c7bf.html.

[12] Lizz Giordano, "A third Sammamish Plateau Water production well shows trace amounts of PFOS," *The Sammamish Review* (Nov. 18, 2016), *available at* http://www.theeastside.news/sammamishreview/news/local/a-third-sammamish-plateau-water-production-well-shows-trace-amounts/article_21d01b4e-adbe-11e6-b825-b7e9746d3fed.html.

[13] Lizz Giordano, "PFOS found in Issaquah Creek near hatchery," *The Issaquah Press* (Oct. 24, 2016), *available at* http://www.theeastside.news/issaquah/news/local/pfos-found-in-issaquah-creek-near-hatchery/article_05f9215e-9a31-11e6-92c9-43253c5943a5.html.

[14] Hu, et al., "Detection of Poly- and Perfluoroalkyl Substances (PFASs) in U.S. Drinking Water Linked to Industrial Sites, Military Fire Training Areas, and Wastewater Treatment Plants," Environmental Science & Technology Letters 3 (10) 344-350 (Aug.9, 2016), *available at* http://pubs.acs.org/doi/abs/10.1021/acs.estlett.6b00260.

[15] *See e.g.* The Air Force and PFCs, https://www.youtube.com/watch?v=GmnQWpgwhRY (last visited Jan. 10, 2017); Air Force Public Affairs, Frequently Asked Questions: PFOS/PFOA (Dec. 1, 2016), *available at* http://www.afcec.af.mil/Portals/17/documents/Environment/FAQ_PFOS-PFOA.pdf?ver=2016-12-01-220350-613; United States Air Force Air Force Civil Engineer Center, Action Memorandum for a Time-Critical Removal Action of PFC-Contaminated Water at Moose Creek, Alaska by Eielson Air Force Base, Alaska (Nov. 18, 2015), *available at* http://alaskacollection.library.uaf.edu/eafbsc/cd0/Moose%20Creek%20PFCs%20Contamination%20Information%20Repository/07_Memorandums/Final%20Memo%20for%20Time-Critical%20Removal%20Action%20of%20PFCs_Moose%20Creek,%20Alaska_18Nov2015.pdf; U.S. EPA, EPA Superfund Program: Willow Grove Naval Air and Air Reserve Station, https://cumulis.epa.gov/supercpad/cursites/csitinfo.cfm?id=0303820 (last visited Jan. 10, 2017); U.S. EPA, EPA Superfund Program: Pease Air Force Base, https://cumulis.epa.gov/supercpad/cursites/csitinfo.cfm?id=0101213 (last visited Jan. 10, 2017); Naval Air Development Center (8 Waste Areas), https://cumulis.epa.gov/supercpad/cursites/csitinfo.cfm?id=0302466 (last visited Jan. 10, 2017).

[16] Hu, et al., "Detection of Poly- and Perfluoroalkyl Substances (PFASs) in U.S. Drinking Water Linked to Industrial Sites, Military Fire Training Areas, and Wastewater Treatment Plants," Environmental Science & Technology Letters 3 (10) 344-350 (Aug.9, 2016), *available at* http://pubs.acs.org/doi/abs/10.1021/acs.estlett.6b00260.

[17] U.S. EPA, Per- and Polyfluoroalkyl Substances (PFASs) Under TSCA, https://www.epa.gov/assessing-and-managing-chemicals-under-tsca/and-polyfluoroalkyl-substances-pfass-under-tsca (last visited Jan. 10, 2017).

[18] U.S. EPA, Per- and Polyfluoroalkyl Substances (PFASs) Under TSCA, https://www.epa.gov/assessing-and-managing-chemicals-under-tsca/and-polyfluoroalkyl-substances-pfass-under-tsca (last visited Jan. 10, 2017); Perfluorooctanoic Acid (PFOA), Fluorinated Telomers; Request for Comment, Solicitation of Interested Parties for Enforceable Consent Agreement Development, and Notice of Public Meeting, 68 Fed. Reg. 73, 18628 (Apr. 16, 2003) *available at* https://www.gpo.gov/fdsys/pkg/FR-2003-04-16/pdf/03-9418.pdf.

[19] *See* U.S. EPA, Per- and Polyfluoroalkyl Substances (PFASs) Under TSCA, https://www.epa.gov/assessing-and-managing-chemicals-under-tsca/and-polyfluoroalkyl-substances-pfass-under-tsca (last visited Jan. 10, 2017); Perfluoroalkyl Sulfonates; Significant New Use Rule, 72 Fed. Reg. 194, 57222 (Oct. 9, 2007), *available at* https://www.gpo.gov/fdsys/pkg/FR-2007-10-09/pdf/E7-19828.pdf.

[20] U.S. EPA, New Chemicals Program Review of Alternatives for PFOA and Related Chemicals, https://www.epa.gov/assessing-and-managing-chemicals-under-tsca/new-chemicals-program-review-alternatives-pfoa-and (last visited Jan. 10, 2017).

[21] *See* U.S. EPA, Drinking Water Health Advisory for Perfluorooctanoic Acid (PFOA) (May 2016), *available at* https://www.epa.gov/sites/production/files/2016-05/documents/pfoa_health_advisory_final_508.pdf.

[22] *See* U.S. EPA, Drinking Water Health Advisory for Perfluorooctane Sulfonate (PFOS) (May 2016), *available at* https://www.epa.gov/sites/production/files/2016-05/documents/pfos_health_advisory_final_508.pdf.

[23] Wash. Dep't of Ecology, What are PFASs?, http://www.ecy.wa.gov/programs/hwtr/rtt/pbt/pfas.html (last visited Jan. 10, 2017).

[24] Wash. Dep't of Ecology and Wash. Dep't of Health, PBT Initiative Overview (Jan. 7, 2015) at 9, *available at* http://www.ecy.wa.gov/programs/hwtr/rtt/pbt/docs/Meeting1Slides_Jan.7.2016.pdf.

[25] Wash. Dep't of Ecology, PFAS CAP Advisory Committee, http://www.ecy.wa.gov/programs/hwtr/rtt/pbt/pfasAdCom.html (last visited Jan. 10, 2017).

[26] Wash. Dep't of Ecology, What are PFASs?, http://www.ecy.wa.gov/programs/hwtr/rtt/pbt/pfas.html (last visited Jan. 10, 2017).

[27] Wash. Dep't of Ecology, What are PFASs?, http://www.ecy.wa.gov/programs/hwtr/rtt/pbt/pfas.html (last visited Jan. 10, 2017).

[28] RCW 70.105D.020; WAC 173-340-200.

[29] "Teratogenic" means "of, relating to, or causing developmental malformations." Merriam-Webster Dictionary, *available at* https://www.merriam-webster.com/dictionary/teratogenic.

[30] "Carcinogen" means "a substance or agent causing cancer." Merriam-Webster Dictionary, *available at* https://www.merriam-webster.com/dictionary/carcinogen.

[31] RCW 70.105.010(a).

[32] U.S. EPA, Fact Sheet PFOA & PFOS Drinking Water Health Advisories (Nov. 2016) at 2, *available at* https://www.epa.gov/sites/production/files/2016-06/documents/drinkingwaterhealthadvisories_pfoa_pfos_updated_5.31.16.pdf. *See also* U.S. EPA, Health Effects Support for Perfluorooctane Sulfonate (PFOS) (May 2016), *available at* https://www.epa.gov/sites/production/files/2016-05/documents/pfos_hesd_final_508.pdf; U.S. EPA, Health Effects Support for Perfluorooctanoic Acid (PFOA) (May 2016), *available at* https://www.epa.gov/sites/production/files/2016-05/documents/pfoa_hesd_final_508.pdf.