

## Technical Memorandum



To: James P. McKnight, City Manager

From: Dean Mericas, Ph.D.

Date: September 27, 2018

Subject: 8/14/2018 PFOS/PFOA Testing Results Summary

### 1.0 Introduction and Background

As part of an investigation into potential concerns regarding PFAS<sup>1</sup> (Per- and Polyfluoroalkyl Substances) at the City of Cocoa Beach Water Reclamation Facility (WRF), Mead & Hunt reviewed and evaluated the results of laboratory analyses of water samples collected in and around the WRF collection system and plant.

PFAS is a large family of man-made compounds that have been widely used in industry for purposes such as stain-resistant treatments, waterproofing, non-stick coatings, mist control agents and firefighting foams<sup>1</sup>. PFOS and PFOA are two PFAS compounds that are “emerging contaminants”, which means that they have been identified as being problematic, but more information and research is needed to fully understand their effects and develop specific regulatory standards for protection of human health and the environment. As a result, there are currently no regulatory water quality standards or criteria that can be used in evaluating sample results. In addition, the Florida Dept. of Environmental Protection (FDEP) does not provide guidance to domestic wastewater facility operators regarding treatment or disposal of treated effluent containing these compounds. An alternative groundwater cleanup target level for the sum of PFOA and PFOS concentrations has been recommended by the University of Florida as 100 parts per trillion (ppt or ng/L)<sup>2</sup>. However, this value has not been codified nor adopted by the FDEP.

As shown in Table 1, the Federal Lifetime Health Advisory (LHA) levels for drinking water are 70 parts per trillion (ppt or ng/L)<sup>3</sup> for PFOS or PFOA or the sum of the compounds. These advisory levels are based on daily ingestion of PFOA and PFOS over a lifetime, and do not apply to less direct or frequent exposure, such as swimming, bathing, or similar contact. The significant margin of conservatism in LHA levels developed for drinking water should be recognized when they are used in evaluating PFOS and PFOA in sanitary sewerage and other non-potable waters.

In the absence of standards or criteria specific to types of water sampled, the LHA levels are used in this analysis for assessing the general magnitude of potential concern associated with PFOS and PFOA in the collected samples. Concentrations higher than the LHA levels are not indications of regulatory violations or even evidence of risk to human health or the environment. Reference levels for evaluating such risks are not currently available.

<b>Table 1: Federal PFOS and PFOA LHA Levels for Drinking Water</b>	
<b>Agency</b>	<b>Lifetime Health Advisory (ng/L)</b>
USEPA Office of Water (2016)	PFOA – 70 PFOS – 70 PFOA+PFOS - 70

## 2.0 Sample Collection and Analyses

SGS North America Inc. performed water sampling at locations in the City of Cocoa Beach to determine PFOS and PFOA concentrations in the collection system feeding the WRF, the reuse water system downstream of the WRF, and in groundwater near the collection and distribution network.

### 2.1 Locations

Nineteen (19) locations were selected for sampling, as shown in Map 1. Six (6) of the sampling locations involved groundwater, and one (1) sampling location was a surface water discharge of stormwater and reuse water runoff (Golf Course Outfall). The twelve (12) remaining samples were collected from the collection system that conveys wastewater to the WRF and the reuse water distribution system. The sampling locations were selected to determine if the system and adjacent groundwater have been affected by PFOS and PFOA, and provide insight as to possible sources.

Lift stations were chosen to indicate the concentration in the wastewater collection system, while the reuse distribution locations were selected to determine the concentrations in the treated non-potable reuse water discharged from the WRF. The private well, artesian well, and Lori Wilson Dog Park Wells are used for irrigation on these properties. The Lori Wilson Dog Park Well is also used for drinking water for pets at the park. Monitoring wells are used for periodic sampling and analysis of shallow aquifer groundwater. The shallow aquifer in the vicinity of these monitoring wells is not utilized for public supply or consumption. The Golf Course Outfall is a surface water body discharge of stormwater and runoff from reuse water used for irrigation at the golf course.

### 2.2 Sample Collection and Analyses

SGS North America Inc. performed water sampling at the 19 locations on August 14, 2018. The samples were collected and analyzed to determine PFOS and PFOA concentrations using method EPA 537M.

### 3.0 Results

Table 2 shows the results of the laboratory analyses. The “nd” notation indicates that the compound was not detected in the sample.

<b>Sampling Location</b>	<b>Perfluorooctanoic acid</b>	<b>Perfluorooctanesulfonic acid</b>	<b>Total PFOA + PFOS</b>
Abbreviation>	PFOA	PFOS	
Units>	ng/L	ng/L	ng/L
Plant Influent 24 Hr Composite	13.2	<b>89.6</b>	<b>102.8</b>
Plant Effluent 24 Hr Composite	18	67	<b>85</b>
Plant Influent Grab	18.2	<b>93.6</b>	<b>111.8</b>
Plant Effluent Grab	20.7	<b>83.5</b>	<b>104.2</b>
Lift Station #3	9.3	31.3	40.6
Patrick Air Force Base Lift Station	16	<b>278</b>	<b>294</b>
Lift Station #17	4.2	19.2	23.4
South Reuse Distribution	22.8	<b>92</b>	<b>114.8</b>
Private Well	nd	nd	nd
Artesian Well	nd	nd	nd
Lori Wilson Dog Park Well	21.3	<b>102</b>	<b>123.3</b>
Lift Station #10	7.9	29	36.9
Lift Station #5	12.4	47.2	59.6
North Reuse Distribution	22.6	nd	22.6
Port Main Lift Station	11.2	9.7	20.8
Golf Course Outfall	30.9	<b>130</b>	<b>160.9</b>
Monitoring Well #4	24.9	62.8	<b>87.7</b>
Monitoring Well #3	30.4	<b>188</b>	<b>218.4</b>
Monitoring Well #2	34.3	<b>191</b>	<b>225.3</b>

Nd = Non-detect

**Bold** = above 70 ng/L LHA for drinking water

## 4.0 Discussion and Conclusions

Of the nineteen (19) sampling locations, eleven (11) were above the USEPA LHA levels. These locations include the Patrick Air Force Base Lift Station, influent and effluent composite and single sample locations at the Cocoa Beach Water Reclamation Facility, Lori Wilson Dog Park Well, Monitoring Wells #2, #3, and #4, and the South Reuse sample location. The Patrick Air Force Base Lift Station showed the highest concentrations observed in the sampling. Of the sampling locations that showed concentrations above the USEPA LHA levels, four (4) were groundwater, six (6) were from the sewer or reclaim systems, and one (1) was surface water.

The four (4) northernmost sampling locations, Port Main Lift Station, Reuse North, Lift Station #5, and Lift Station #10 showed PFOA and PFOS present, but below the LHA levels. PFOS and PFOA were not detected in the Private Well or the Artesian Well.

Acknowledging the inherent limitations in a single round of samples and the absence of a regulatory or scientific reference for evaluating concentrations in the specific types of water samples collected, the following observations and conclusions are provided:

- The results suggest that elevated PFOS and PFOA are associated with portions of the WRF system influenced by discharges from Patrick Air Force Base into the collection system.
- With the exception of the North Reuse Distribution and Port Main Lift Station samples, PFOS concentrations are greater than PFOA in the samples with detectable levels.
- The data suggest that the WRF treatment process is removing some PFOS and PFOA from wastewater, but potentially elevated concentrations remain in treated effluent.
- The elevated PFOS and PFOA concentrations observed in the monitoring wells, golf course outfall discharge and South reuse sample might reflect the presence of PFOS and PFOA in treated reuse water.
- Low PFOS and PFOA concentrations at in the North reuse sample are not consistent with the treated effluent concentrations.
- The elevated PFOS and PFOA concentrations in the dog park well are not well explained by the available information.
- The presence of PFOS and PFOA may reflect both current and historic sources in the sampled area. These chemicals are very persistent and “sticky” in that they adhere to surfaces in soils, pipes, tanks, and other parts of a collection, treatment, and distribution system.

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## References

<sup>1</sup> USEPA, Technical Fact Sheet- PFOS and PFOA, Nov. 2017

<sup>2</sup> University of Florida Center for Environment & Human Toxicology, Apr. 2017

<sup>3</sup> USEPA, Fact Sheet: PFOA & PFOS Drinking Water Health Advisories

<sup>4</sup> SGS International, Inc., Technical Report for the City of Cocoa Beach Water Reclamation PFOS/PFOA Testing, Sept. 2018