Geosyntec consultants

Geosyntec Consultants of NC, P.C.
NC License No.: C-3500 and C-295

STORMWATER TREATMENT SYSTEM CAPTURE AND REMOVAL EFFICIENCY REPORT

Chemours Fayetteville Works

Prepared for

The Chemours Company FC, LLC
22828 NC Highway 87
Fayetteville, NC 28306

Prepared by

Geosyntec Consultants of NC, P.C.
2501 Blue Ridge Road, Suite 430
Raleigh, NC 27607

DocuSigned by:
15D6CDF15426487...
9/30/2021

Project Number TR0807E

September 30, 2021

EXECUTIVE SUMMARY

This Stormwater Treatment System Removal Efficiency and Capture Report has been prepared pursuant to paragraph 4(c) of the Addendum to Consent Order Paragraph 12 (CO Addendum). Paragraph 4(c) requires that Chemours demonstrate that the Monomers/Ion Exchange Materials (IXM) stormwater capture and treatment system (the Treatment System) consistently captures stormwater from the Monomers/IXM area in rain events up to one (1) inch within a 24-hour period and removes per- and polyfluoroalkyl substances (PFAS) parameters, as measured by concentrations of indicator parameters hexafluoropropylene oxide dimer acid (HFPO-DA), perfluoromethoxypropyl carboxylic acid (PMPA), and 2,2-difluoro-2-(trifluoromethoxy) acetic acid (PFMOAA), at a minimum removal efficiency of 99%.

During the July through August 2021 evaluation period:

- The Treatment System appears to have consistently captured stormwater runoff from precipitation events of up to the 1-inch, 24-hour design storm.[1,2]
- The Treatment System removed all three indicator PFAS to greater than 99% during the months of July and August 2021.

The overall capture and efficiency of the Treatment System is within expectations of design and meeting the requirements of CO Addendum paragraph 4(c).

---

1 For the July through August 2021 evaluation period, bypass flow was estimated using the methods described in Section 4.4.1. Bypass is planned to be measured at the overflow pipes moving forward; continuous flow meters are currently installed and undergoing calibration.

2 As described in Section 5.1, during the first precipitation event after commissioning, an equipment malfunction resulted in a small volume of stormwater runoff being diverted to bypass. This malfunction was corrected within 30 minutes of rainfall beginning. Mechanisms have been put into place to avoid this in the future.

Geosyntec consultants

Geosyntec Consultants of NC, P.C.
NC License No.: C-3500 and C-295

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

LIST OF ABBREVIATIONS

CO	Consent Order
EQ	equalization
DVM	Data Verification Module
EIM	Environmental Information Management
HFPO-DA	hexafluoropropylene oxide dimer acid
IXM	ion exchange materials
NCCW	non-contact cooling water
NCDEQ	North Carolina Department of Environmental Quality
NPDES	National Pollutant Discharge Elimination System
PFAS	per- and polyfluoroalkyl substances
PFMOAA	2,2-difluoro-2-(trifluoromethoxy) acetic acid
PMPA	perfluoromethoxypropyl carboxylic acid
QA/QC	quality assurance/quality control
TSS	total suspended solids
WWTP	wastewater treatment plant

1 INTRODUCTION

Geosyntec Consultants of NC, P.C. (Geosyntec) has prepared this Stormwater Treatment System Removal Efficiency and Capture Report on behalf of The Chemours Company FC, LLC (Chemours) pursuant to the requirements of paragraph 4(c) of the Addendum to Consent Order Paragraph 12 (CO Addendum). Paragraph 4(c) requires that Chemours demonstrate that the Monomers/Ion Exchange Materials (IXM) stormwater capture and treatment system (the Treatment System) consistently captures stormwater from the Monomers/IXM area in rain events up to one (1) inch within a 24-hour period and removes per- and polyfluoroalkyl substances (PFAS) parameters, as measured by concentrations of indicator parameters hexafluoropropylene oxide dimer acid (HFPO-DA), perfluoromethoxypropyl carboxylic acid (PMPA), and 2,2-difluoro-2-(trifluoromethoxy) acetic acid (PFMOAA), at a minimum removal efficiency of 99%.

This summary report presents the demonstration that the Treatment System meets these requirements based on the methods and scope outlined in the Stormwater Treatment System Sampling Plan (the Sampling Plan; Geosyntec, 2021a). Pursuant to CO Addendum paragraph 4(b), the Sampling Plan was submitted to the North Carolina Department of Environmental Quality (NCDEQ) on September 30, 2020; revised based on comments received from NCDEQ on April 26, 2021 and resubmitted on May 11, 2021; and approved by NCDEQ on June 25, 2021 (Chernikov, Sergei. Email to Christel Compton. June 25, 2021). The Sampling Plan and associated monthly Monitoring Reports may be modified based on changes in site conditions, adjustments in understanding of site conditions, or potential sampling requirements in future permits for the Treatment System, such as a National Pollutant Discharge Elimination System (NPDES) permit.

2 TREATMENT SYSTEM DESCRIPTION

Chemours installed a Treatment System which became operational as of June 30, 2021 and serves to remove PFAS from stormwater runoff from 13.9 acres within the Monomers/IXM area (Figure 1). The Treatment System was installed adjacent to the wastewater treatment plant (WWTP). Stormwater runoff from the Monomers/IXM area is diverted from the site conveyance network into sumps and transferred to EQ storage (Figure 2). Stormwater is currently transferred to a temporary tank; a permanent tank will be commissioned following completion of WWTP upgrades. The channels surrounding the Monomers/IXM area formerly conveyed combined stormwater and non-contact cooling water (NCCW); the NCCW has mostly been separated from stormwater and is now conveyed in a separate pipe that discharges into the conveyance network channels downstream of the stormwater capture area.

The stormwater capture system comprises two sumps, the east diversion sump and the west diversion sump. These sumps act as collection points for stormwater and provide intermediate storage before pumps located in the sumps transfer the water to equalization (EQ) storage. The east diversion sump is located in the southwest corner of the Monomers area. The west diversion sump is located adjacent to the northeast conveyance channel alignment.

Starting June 30, 2021, stormwater flows in the conveyance network surrounding the Monomers/IXM area were captured, collected, and transferred to EQ storage. The diversion sumps, pumps, EQ storage, and Treatment System were collectively sized to capture stormwater runoff from a 1-inch, 24-hour design storm from the drainage area shown in Figure 1.

While the channels surrounding the Monomers/IXM area now primarily serve as stormwater only collection channels, during the initial startup and commissioning phases, and during maintenance events, some NCCW flows and other non-stormwater flows were periodically conveyed in the channels. Nominal non-stormwater flows that were diverted to EQ storage were treated along with captured stormwater by the Treatment System.

A design storm is a hypothetical discrete rainstorm (in this case, characterized by a specific rainfall of 1 inch and 24 hours of duration using a National Resource Conservation Service [NRCS] Type II storm distribution to simulate a peak intensity) that is used in the design of a stormwater control measure. Sizing a stormwater control measure involves calculating the volume of runoff resulting from the specified design storm that will drain to the control measure. Therefore, the Treatment System was sized to capture and treat runoff equivalent to the design storm volume. The Treatment System was also designed to capture runoff from the peak intensity of the design storm event. The Treatment System will not necessarily capture and treat all runoff from larger storms or a series of storm events that occur in close proximity to each other, including successive 1 inch, 24-hour storm events.

The basis of design for the Treatment System, including sizing calculations, is described in Geosyntec (2021b). The design volume for the 1-inch storm was estimated to be 300,800 gallons; consequently, pumps for the east and west diversion sumps have been designed and installed to capture up to the design storm volume in a 24-hour period and convey this volume to EQ storage.

The Treatment System has been constructed to treat collected stormwater in EQ storage at a design flowrate of 150 gallons per minute and to achieve effluent targets for the

indicator parameters HFPO-DA, PMPA, and PFMOAA. The Treatment System includes: (i) a settling tank and solids handling system for the backwash waste from the prefiltration system and carbon beds (which may include chemical dosing skids); (ii) prefiltration to remove total suspended solids (TSS), turbidity, and other constituents that may clog and potentially reduce PFAS removal by downstream unit operations; and (iii) three (3) granular activated carbon vessels to remove indicator PFAS parameters. For storm events larger than the design storm, stormwater flows that bypass the in-line diversion structures to the Treatment System will flow to Outfall 002.

3 OBJECTIVES OF THE STORMWATER TREATMENT SYSTEM SAMPLING PROGRAM

Implementation of the Sampling Plan is intended to achieve the following objectives:

- Evaluate flow at the diversion sumps that is transferred to EQ storage for treatment;
- Evaluate flow bypassing the diversion sumps;
- Evaluate flow into EQ storage;
- Evaluate the flow and water quality of the stormwater influent to the Treatment System. Influent water quality parameters evaluated include HFPO-DA, PMPA, and PFMOAA;
- Evaluate the flow and water quality of the stormwater effluent from the Treatment System. Effluent water quality parameters evaluated include HFPO-DA, PMPA, PFMOAA, pH, and total suspended solids (TSS);
- Assess the Treatment System PFAS removal efficiency for comparison to the CO Addendum requirement of 99% removal; and
- Evaluate PFAS concentrations in the flow bypassing the diversion sumps on a quarterly basis.

Data collected as a part of the Sampling Plan are recorded on a monthly Monitoring Report for transmittal to NCDEQ. The Monitoring Report developed as a part of the Sampling Plan includes separate sheets for: (1) the influent (flow transferred to EQ storage from the diversion sumps, flow, and water quality of the stormwater influent to Treatment System); (2) the effluent (flow and water quality of the effluent from the

Treatment System); (3) bypass (flow and water quality of stormwater bypassing the Treatment System); and (4) removal efficiency calculations.

This summary report presents the data collected and analyses conducted for the evaluation period of July through August 2021 for stormwater capture and removal efficiency of the Treatment System.

4 METHODS AND SCOPE

This section summarizes, for the months of July and August 2021, the methods and scope for evaluating the effectiveness of the Treatment System in (1) consistently capturing stormwater from the Monomers/IXM area in events up to one (1) inch within a 24-hour period; and (2) removing indicator PFAS parameters at a minimum removal efficiency of 99%. The sampling and flow measurement methods implemented and described below were largely in accordance with the Sampling Plan (Geosyntec, 2021a). Some minor modifications were necessary due to delays in equipment receipt and Treatment System operations and are noted below.

4.1 Sampling Schedule, Types, and Locations

The Sampling Plan specifies collection of influent and effluent samples for up to four sampling events each month for use in the calculation of the system removal effectiveness, provided there is sufficient rainfall and volume to collect the samples. The ability to collect samples was therefore dependent upon the Treatment System operations and the occurrence of rainfall events of sufficient volume to start-up and operate the Treatment System.

In accordance with the Sampling Plan, influent and effluent sampling was performed when the Treatment System was discharging treated stormwater and sampling events were collected at least three days apart. Sampling events are referred to as Monitored Discharge Events for reporting purposes. Influent and effluent samples were collected three times in July 2021 (July 2, 2021; July 8, 2021; and July 19, 2021) and four times in August 2021 (August 4, 2021; August 10, 2021; August 18, 2021; and August 22, 2021).

The Sampling Plan also specifies the evaluation of bypass samples at least once a quarter. Bypass samples for 2021 Quarter 3 (July – September 2021) were collected on September 21, 2021 once stormwater began bypassing the sumps after approximately 1.50 inches of rainfall. The samples collected from this event have been submitted for analysis, but results have not yet been received. The quarterly bypass results from the

September 21, 2021 bypass event will be reported on the September 2021 Monitoring Report.

4.2 Field Methods

Influent and effluent samples were collected as time-weighted composite samples. In accordance with the Sampling Plan, samples were generally collected on the first day of operation of the Treatment System during a treatment event; subsequent days were not sampled unless there were at least three days between sample collection. Due to pandemic-related supply chain issues and subsequent backorders on autosamplers, the autosamplers were not installed for the July and August 2021 sampling events and grab samples were collected manually for compositing. Samples were manually collected into pre-cleaned, 250 milliliter high density polyethylene bottles every two hours during the Treatment System operations for the Monitored Discharge Event and were composited into one sample for analysis.

4.2.1 Field QA/QC Samples

Quality assurance/quality control (QA/QC) samples, including field duplicates, equipment blanks, and field blanks, are specified to be collected to meet an overall frequency of a minimum of twenty percent (20%) for the program. A field duplicate was collected on July 8, 2021. Equipment blanks were not collected because non-dedicated sampling equipment (e.g., an autosampler) was not used for sample collection during the July through August 2021 evaluation period. Equipment blanks will be collected in the future once autosamplers are installed for sample collection. Field blanks will also be collected during future sampling events.

4.2.2 Field Parameters

Field parameters (e.g., pH, temperature, turbidity) were measured at the beginning of composite sampling (after the first subsample was collected), and after composite sampling was completed (collected from the composite sample reservoir). Location-specific field forms were used to record information regarding additional items such as QA/QC, sample identifications, color, odor, and other field observations.

4.2.3 Sample Packing and Shipping

After sample collection, labelled and containerized samples were placed inside an insulated sample cooler with ice. Prior to shipment of the samples to the laboratory, a chain of custody form was completed identifying sample locations, sample identification numbers, and specific laboratory analyses to be performed on the

samples. Chain of custody forms were signed by the field personnel relinquishing the samples to the courier and were signed by the laboratory upon receipt of the cooler. Samples were shipped to and analyzed at Eurofins Lancaster Laboratories Environmental (Lancaster, PA).

4.3 Laboratory Methods

Samples were analyzed using the methods shown in Table 1.

Each influent and effluent sample was analyzed for HFPO-DA, PMPA, and PFMOAA. Effluent samples were also analyzed for TSS.

The quarterly grab sample collected on September 21, 2021 from flow bypassing the diversion sumps will be analyzed for Table 3+ parameters. PFAS reported under the Table 3+ Laboratory Standard Operating Procedure are listed in Table 2.

Data were reviewed using the Data Verification Module (DVM) within the Locus™ Environmental Information Management (EIM) system, which is a commercial software program used to manage data. Following the DVM process, a manual review of the data was conducted. The data usability, in view of the project's data quality objectives, was assessed and the data were entered into the EIM system. Laboratory reports and the data review narrative whitebooks are provided in Appendix A.

4.4 Flow Measurement Methods

The Sampling Plan identified seven locations to collect flow or water level measurements to assess Treatment System capture efficiency. During Treatment System operations in July through August 2021, some of the flow measurement methods outlined in the Sampling Plan were modified due to delays in equipment receipt. Additionally, some flow measurement locations were determined to be duplicative of other measurement locations. The Sampling Plan provided provisions for modifying methods due to site conditions. Modifications to methods used for the July through August 2021 evaluation period are outlined below. Flow measurement locations are also summarized in Table 1.

Flow Measurement Location	Sampling Plan Methods	July through August 2021 Modified Methods	Reason for Modification
East Diversion Sump	Totalizer	East and west diversion flows measured via a totalizer and recorded as a combined total; see Influent to the equalization (EQ) storage parameter	Simplify reporting requirements; totalizer measuring east and west diversion flows to EQ storage reported as a combined total
East Diversion Sump Bypass	Continuous flow measurement	Bypass flow estimated based on SWMM model and measured water level in sump (see Section 4.4.1)	Instrumentation to measure bypass at overflow pipe has not yet been installed due to delays in equipment receipt
West Diversion Sump	Totalizer	East and west diversion flows measured via a totalizer and recorded as a combined total; see Influent to the EQ Storage System parameter	Simplify reporting requirements; totalizer measuring east and west diversion flows to EQ storage reported as a combined total
West Diversion Sump Bypass	Continuous flow measurement	Bypass flow estimated based on SWMM model (see Section 4.4.1)	Instrumentation to measure bypass at overflow pipe not yet installed due to delays in equipment receipt
Influent to EQ Storage	Continuous flow measurement	Totalizer	Instrumentation is a totalizer and not a continuous flow measurement. Represents the combined east and west diversion flows
Influent to the Treatment System	Continuous flow measurement	Totalizer at Treatment System discharge; see Effluent from the Treatment System parameter	Simplify reporting requirements; assumed influent to the treatment system on a daily basis is equivalent to the measured effluent flow
Discharge from the Treatment System	Continuous flow measurement	Totalizer at Treatment System discharge	Instrumentation on effluent of the Treatment System is a totalizer and not a continuous flow measurement

If there was no recorded discharge from the Treatment System, the Monitoring Report was marked as “no discharge.” The Monitoring Reports for July 2021 and August 2021 are provided in Appendix B.

4.4.1 Bypass Estimates

Due to pandemic-related supply chain issues, bypass flow meters were not installed until late September 2021 to measure flow in the overflow pipes. Bypass flows on precipitation days were estimated by comparing the volume transferred to EQ storage to runoff volume estimates generated from Stormwater Management Model (SWMM) version 5.1. The SWMM model was previously developed to size the Treatment System as detailed in Geosyntec (2021b) and was simulated using onsite precipitation recorded from July through August 2021. Daily runoff volumes were summed from the model output and compared to the daily recorded volumes that were transferred to EQ storage. The daily bypass volume was estimated to be the difference between the modeled daily runoff volume and the daily volume transferred to EQ storage.

For the precipitation days where runoff volume exceeded the volume transferred to EQ storage, the percentage of the east diversion sump capacity that was full was evaluated to verify bypass occurred as predicted by the model. The invert elevation of the overflow pipe in the east sump is equivalent to the elevation at which the east diversion sump capacity is 80% full. If the east diversion sump was greater than 80% full on precipitation days where bypass was estimated to have occurred (based on the first evaluation comparing modeled daily runoff volume to the daily volume transferred to EQ storage), then it was assumed a bypass event occurred as modeled. Bypass was typically verified to have occurred after the total flow transferred to EQ storage exceeded 300,800 gallons in a 24-hour period and the pumps turned off.

This evaluation of the percentage full of the sump capacity was assessed for the east diversion sump in July and August 2021. Due to delays in equipment receipt, the west diversion sump level transmitter was installed in late August 2021. While the west diversion sump water level data were not available to evaluate potential bypass during July and August 2021, a preliminary evaluation of the data collected through the end of September 2021 was conducted for both diversion sumps. This evaluation (discussed in Section 5.1) indicates that stormwater runoff from events up to 1 inch in 24 hours appears to be consistently captured.

Bypass flow meters were installed in the overflow pipes during the week of September 20 – 24, 2021, and are undergoing calibration to measure bypass flows in the future.

4.5 Removal Efficiency Calculations

As outlined in the Sampling Plan (Geosyntec, 2021a), the Treatment System PFAS removal effectiveness was defined by the percentage removal of each of the three indicator parameters (HFPO-DA, PFMOAA, and PMPA) on a monthly average basis

using composite influent and effluent samples. The Treatment System PFAS removal efficiency was calculated on a monthly average basis using Equation 1 below. Non-detect influent and effluent sample results were assigned a value of zero for the calculation and the values from duplicate samples were averaged together.

The system PFAS removal efficiency calculation uses volume-weighted concentrations of the influent and effluent samples to calculate the percentage of mass removal. Volume-weighted concentrations were developed in the event that either the influent and effluent autosamplers have different compositing durations or that the composite sampling periods in the month have different durations. Both circumstances could arise due to a potential equipment malfunction or a severe weather event. Weighting by volume provides a representative assessment of mass present in both the influent and effluent over time; samples corresponding to greater flow volumes will have a proportionately higher weight.

Equation 1: System Removal Effectiveness for Indicator Parameters

$$E_{TS-IXM,i} = \left(1 - \frac{c_{eff,i}}{c_{inf,i}}\right) \times 100\%$$

$$= \left(1 - \frac{\sum_{m=1}^{M} c_{eff,m,i} \times w_m}{\sum_{n=1}^{N} c_{inf,n,i} \times w_n}\right) \times 100\%$$

$$= \left(1 - \frac{\sum_{m=1}^{M} c_{eff,\mathrm{m},i} \times \frac{V_m}{\sum_{m=1}^{M} V_m}}{\sum_{n=1}^{N} c_{inf,n,i} \times \frac{V_n}{\sum_{n=1}^{N} V_n}}\right) \times 100\%$$

where,

$E_{TS-IXM-i}$ = is the Treatment System PFAS removal efficiency for the given indicator parameters, i (HFPO-DA, PMPA, or PFMOAA);

$c_{eff,i}$= is the volume weighted effluent concentration for a given evaluation period for the given indicator parameters, *i* (HFPO-DA, PMPA or PFMOAA);

$c_{inf,i}$ = is the volume weighted influent concentration for a given evaluation period for the given indicator parameters, *i* (HFPO-DA, PMPA or PFMOAA);

m = represents an individual effluent composite sample during a given evaluation period;

M = is the total number of effluent composite samples during a given evaluation period;

n = represents an individual influent composite sample during a given evaluation period;

N = is the total number of influent composite samples during a given evaluation period;

i = represents the three indicator parameters HFPO-DA, PMPA, or PFMOAA;

$c_{eff,m,i}$ = is the measured concentration of the indicator parameter for each effluent composite sample;

$c_{inf,n,i}$ = is the measured concentration of the indicator parameter for each influent composite sample;

w_m = is the effluent concentration volumetric weighting factor calculated for and applied individually to each effluent composite sample concentration;

V_m = is the volume of water entering (and exiting) the Treatment System during the effluent composite sample collection period;

w_n = is the influent concentration volumetric weighting factor calculated for and applied individually to each influent composite sample concentration; and

V_n = is the volume of water entering (and exiting) the Treatment System during the influent composite sample collection period.

4.6 Associated Data Recording Scope

The following types of data were evaluated during Treatment System operation and recorded on the Monitoring Report as relevant.

- Precipitation during a given evaluation period at the onsite meteorological station;
- Stormwater volume transferred to EQ storage on days with precipitation;[3]

[3] On days without precipitation, some nominal non-stormwater flows were diverted to EQ storage due to startup and commissioning and/or maintenance and were not recorded on the Monitoring Report as these flows are not representative of stormwater flows. Nominal non-stormwater flows that are diverted to EQ storage are treated along with captured stormwater by the Treatment System.

- Stormwater volume treated by the Treatment System during the monthly evaluation period;
- Stormwater volume bypassing the Treatment System during the monthly evaluation period;
- Influent and effluent concentration data for Monitored Discharge Events; and
- Effluent pH and TSS for Monitored Discharge Events.

5 RESULTS

Analytical results from the July through August 2021 evaluation period are provided in Table 3. Field parameters recorded during sample collection are provided in Table 4. The Monitoring Reports for July 2021 and August 2021 are provided in Appendix B. The evaluation of consistent capture of the 1-inch storm and removal efficiency evaluation are described in Sections 5.1 and 5.2, respectively.

5.1 Evaluation of Consistent Capture of the 1-inch, 24-hour Design Storm

The following section describes an assessment of capture of the 1-inch, 24-hour design storm based on an evaluation of the days when bypass was estimated to have occurred.

Estimated bypass flows for the evaluation period demonstrate that the Treatment System is capable of capturing the 1-inch, 24-hour design storm. During the reporting period, 13 days in July 2021 and 11 days in August 2021 had observed precipitation. Bypass was estimated to have occurred on three days in July 2021 and no bypass was estimated to have occurred in August 2021. Two of the bypass events were associated with precipitation events in excess of 1 inch in 24 hours, and the third bypass event was attributed to equipment malfunction. The remaining 21 days in July and August 2021 had recorded precipitation less than 1 inch; bypass was not estimated to occur on these days.

Two storm-related bypass events occurred on July 8, 2021 and July 19, 2021, during precipitation events of 2.16 inches and 4.33 inches, respectively. On both of those days, the design volume (nominally 300,000 gallons) was transferred to EQ storage prior to the pumps being turned off; therefore, capture of the 1-inch, 24-hour storm was achieved for both days and the bypasses were allowable bypass events.

Another bypass event occurred on July 2, 2021, which was the first precipitation event that occurred after Treatment System startup on June 30, 2021. Total precipitation

recorded during the storm event was 0.77 inches. The diversion pumps were inadvertently locked out of service and therefore did not turn on when the sumps began filling up; this was realized approximately 30 minutes after rainfall began and corrected. This resulted in an estimated bypass volume of approximately 33,000 gallons.

A summary of the estimated bypass is provided in the table below.

Date	Precipitation in	Estimated Runoff from SWMM gal	Volume Transferred to EQ Storage gal	Estimated Bypass Volume gal	Volume up to 1 inch transferred?	Reason for Bypass
7/2/2021	0.77	233,870	200,861	33,009	-[1]	Equipment malfunction. Pumps locked out of service for ~ 30 minutes
7/8/2021	2.16	698,916	337,846	361,070	Yes	Storm event greater than 1 inch
7/19/2021	4.33	1,450,073	335,790	1,114,283	Yes	Storm event greater than 1 inch

1. This precipitation event was less than 1 inch and therefore was modeled to generate less stormwater runoff than the design volume of 300,800 gallons.

5.1.1 West Diversion Sump September 2021 Capture Data

A preliminary evaluation of the east and west diversion sump water level data for September 2021 was conducted to evaluate if and when bypass flows occurred during rainfall events. The evaluation of the east and west diversion sump data indicated bypass occurred intermittently from September 21 – 23, 2021. On the days of September 21 to 22, 2021, two back-to-back storm events resulted in a total precipitation depth of 2.27 inches (1.70 inches and 0.57 inches on September 21, 2021 and September 22, 2021, respectively). Bypass occurred after runoff from upwards of 1 inch of rainfall was captured on September 21, 2021. While the Treatment System began operating starting September 21, 2021, the capacity of the EQ storage did not allow for capture and storage of all stormwater runoff on subsequent days. This observation is consistent with the Stormwater Capture and Treatment System Engineering Report that stated “the Treatment System will not necessarily capture and treat all runoff from storms with depths of one inch in 24 hours due to some storms occurring in close time proximity to each other.” (Geosyntec, 2021b).

Bypass was not observed during the four (4) other days with precipitation events that were less 1 inch in 24 hours at either diversion sump. The final data will be reported in the September 2021 Monitoring Report once the corresponding analytical results have been received. This preliminary evaluation is consistent with observations from the July and August 2021 period that stormwater runoff from events up to 1 inch in 24 hours appears to be consistently captured according to expectations outlined previously.

Bypass flow meters were installed in the overflow pipes during the week of September 20 – 24, 2021, and are undergoing calibration in order to more accurately measure bypass flows in the future.

5.2 Removal Efficiency Evaluation

Three (3) sample events in July 2021 and four (4) sample events in August 2021 were collected and analyzed for indicator PFAS parameters (Table 3, Appendix B). The volume-weighted influent and effluent concentrations were developed based on methods described in Section 4.5 and recorded in the monthly Monitoring Report (Appendix B). Percent removal of all three indicator PFAS exceeded 99% for the months of July and August 2021, as summarized in the table below. The Treatment System has therefore demonstrated to be capable of achieving the 99% removal efficiency required by the CO Addendum.

Month	Volume-weighted Influent Concentration[1]			Volume-weighted Effluent Concentration[1]			Treatment System PFAS Removal Efficiency for HFPO-DA, PFMOAA, and PMPA[1]		
	HFPO-DA	***PFMOAA***	***PMPA***	***HFPO-DA***	***PFMOAA***	***PMPA***	***HFPO-DA***	***PFMOAA***	***PMPA***
	µg/L	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**%**	**%**	**%**
July 2021	26	6.6	1.2	0.002	0.031	0.000	99.99	99.53	100.0
August 2021	27	5.7	1.4	0.000	0.000	0.000	100.0	100.0	100.0

µg/L – micrograms/Liter
HFPO-DA - hexafluoropropylene oxide dimer acid
PFMOAA - 2,2-difluoro-2-(trifluoromethoxy) acetic acid
PMPA - perfluoromethoxypropyl carboxylic acid
1. In accordance with Equation 1 and as outlined the Sampling Plan, non-detect influent and effluent sample results were assigned a value of zero for the volume-weighted calculation and subsequently the removal efficiency calculation. The practical quantitation limits for the three indicator parameters ranged from 0.002 to 0.010 µg/L.

6 SUMMARY AND RECOMMENDATIONS

This section presents the summary of the stormwater capture and treatment system performance against CO Addendum paragraph 4(c) requirements and then presents recommendations for ongoing sample collection and flow monitoring.

6.1 Summary

This report has demonstrated that the Treatment System is operating within the requirements of CO Addendum paragraph 4(c). During the July through August 2021 evaluation period the following observations were made:

- The Treatment System appears to have consistently captured stormwater runoff from precipitation events up to the 1-inch, 24-hour design storm.[4, 5]
- The Treatment System removed all three indicator PFAS to greater than 99% during the months of July and August 2021.

The overall capture and efficiency of the Treatment System is within expectations of design and meeting the requirements of CO Addendum paragraph 4(c).

6.2 Recommendations

During the first two months of operation, flow or water level measurements differed from what was proposed in the Sampling Plan due to site conditions and pandemic-related supply chain issues. Additionally, measuring flow at some of the locations was found to be duplicative in practice. Modifications to the Sampling Plan were therefore made in July and August 2021 and reflect improvements for the data being collected.

Geosyntec recommends that these modified methods be used for future sampling and monitoring to streamline the monthly reporting requirements. These changes are summarized in the table below. Chemours will submit an updated Stormwater Sampling

---

[4] For the July through August 2021 evaluation period, bypass flow was estimated using the methods described in Section 4.4.1. Bypass is planned to be measured at the overflow pipes moving forward; continuous flow meters are currently installed and undergoing calibration.

[5] As described in Section 5.1, during the first precipitation event after commissioning, an equipment malfunction resulted in a small volume of stormwater runoff being diverted to bypass. This malfunction was corrected within 30 minutes of rainfall beginning. Mechanisms have been put into place to avoid this in the future.

Plan and example Monitoring Report to reflect these changes to NCDEQ for review and approval.

Flow Measurement Location	**Sampling Plan Methods**	**Proposed Method for Future Treatment System Sampling**
East Diversion Sump	Totalizer	Eliminate reporting as a separate parameter; report with flow from West Diversion Sump as Influent to the EQ Storage
East Diversion Sump Bypass[6]	Continuous flow measurement	Continuous flow measurement; currently undergoing calibration
West Diversion Sump	Totalizer	Eliminate reporting as a separate parameter; report with flow from East Diversion Sump as Influent to the EQ Storage
West Diversion Sump Bypass[6]	Continuous flow measurement	Continuous flow measurement; currently undergoing calibration
Influent to EQ Storage	Continuous flow measurements	Measured via totalizer associated with combined east and west sumps
Influent to the Treatment System	Continuous flow measurement	Eliminate; assume equivalent to effluent from Treatment System
Discharge from the Treatment System	Continuous flow measurement	Totalizer at Treatment System discharge

Sampling and flow measurements for future months will continue to be collected in accordance with the updated Sampling Plan. Results will be submitted via transmittal of a Monitoring Report via email.

[6] For the July through August 2021 evaluation period, bypass flow was estimated using the methods described in Section 4.4.1. Bypass is planned to be measured at the overflow pipes moving forward; continuous flow meters are currently installed and undergoing calibration.

7 REFERENCES

Geosyntec, 2021a. Stormwater Treatment System Sampling Plan. May 2021.

Geosyntec, 2021b. Stormwater Capture and Treatment System Engineering Report and Data Analysis. January 2021.

TABLES

TABLE 1
SAMPLING AND ANALYSIS AND FLOW MEASUREMENT - JULY AND AUGUST 2021
Chemours Fayetteville Works, North Carolina

Parameter/Measurement	Sample Type	Measurement Type	Analytical Method	Sample Collection[1]						
				From the East Channel		From the West Channel		EQ Storage	Influent to Treatment System	Effluent from Treatment System
				East Diversion Sump	Bypass	West Diversion Sump	Bypass			
HFPO-DA, PMPA, PFMOAA	Time-weighted composite	Lab Analysis	Table 3+ Lab SOP						X	X
Table 3+ PFAS	Grab	Lab Analysis	Table 3+ Lab SOP		X		X			
TSS	Time-weighted composite	Lab Analysis	EPA SM 2540D							X
pH	Grab	Field Parameter	-							X
Flow	Continuous[2]	Field Parameter	-		Estimated[3]		Estimated[3]	X		X

Notes:

EQ - Equalization

HFPO-DA - Hexafluoropropylene oxide dimer acid

PFAS - per- and polyfluoroalkyl substances

PMPA - Perfluoromethoxypropyl carboxylic acid

PFMOAA - Perfluoro-2-methoxyacetic acid

TSS - Total Suspended Solids

SM - Standard Method

SOP - Standard Operating Procedure

1. Sampling was performed when the Treatment System was discharging treated stormwater. Samples were collected up to four times per month.

2. Continuous measurements were summed via a totalizer.

3. Bypass flows were estimated using the methods described in Section 4.4.1.

TABLE 2
PFAS AND ASSOCIATED ANALYTICAL METHODS - JULY AND AUGUST 2021
Chemours Fayetteville Works, North Carolina

Analytical Method	Common Name[1]	PFAS Grouping		Chemical Name	CASRN	Chemical Formula
		Table 3+ (17 compounds)	Table 3+ (20 compounds)			
Table 3+ SOP	HFPO-DA[2]	✓	✓	Hexafluoropropylene oxide dimer acid	13252-13-6	C6HF11O3
	PEPA	✓	✓	Perfluoro-2-ethoxypropionic acid	267239-61-2	C5HF9O3
	PFECA-G	✓	✓	Perfluoro-4-isopropoxybutanoic acid	801212-59-9	C12H9F9O3S
	PFMOAA	✓	✓	Perfluoro-2-methoxyacetic acid	674-13-5	C3HF5O3
	PFO2HxA	✓	✓	Perfluoro-3,5-dioxahexanoic acid	39492-88-1	C4HF7O4
	PFO3OA	✓	✓	Perfluoro-3,5,7-trioxaoctanoic acid	39492-89-2	C5HF9O5
	PFO4DA	✓	✓	Perfluoro-3,5,7,9-tetraoxadecanoic acid	39492-90-5	C6HF11O6
	PMPA	✓	✓	Perfluoro-2-methoxypropionic acid	13140-29-9	C4HF7O3
	Hydro-EVE Acid	✓	✓	2,2,3,3-tetrafluoro-3-({1,1,1,2,3,3-hexafluoro-3-[(1,2,2,2-tetrafluoroethyl)oxy]propan-2-yl}oxy)propionic acid	773804-62-9	C8H2F14O4
	EVE Acid	✓	✓	2,2,3,3-tetrafluoro-3-({1,1,1,2,3,3-hexafluoro-3-[(1,2,2-trifluoroethenyl)oxy]propan-2-yl}oxy)propionic acid	69087-46-3	C8HF13O4
	PFECA B	✓	✓	Perfluoro-3,6-dioxaheptanoic acid	151772-58-6	C5HF9O4
	R-EVE	--	✓	Pentanoic acid, 4-(2-carboxy-1,1,2,2-tetrafluoroethoxy)-2,2,3,3,4,5,5,5-octafluoro-	2416366-22-6	C8H2F12O5
	PFO5DA	✓	✓	Perfluoro-3,5,7,9,11-pentaoxadodecanoic acid	39492-91-6	C7HF13O7
	R-PSDA	--	✓	Pentanoic acid, 2,2,3,3,4,5,5,5-octafluoro-4-(1,1,2,2-tetrafluoro-2-sulfoethoxy)-	2416366-18-0	C7H2F12O6S
	R-PSDCA	✓	✓	Ethanesulfonic acid, 1,1,2,2-tetrafluoro-2-[1,2,2,3,3-pentafluoro-1-(trifluoromethyl)propoxy]-	2416366-21-5	C6H2F12O4S
	Hydrolyzed PSDA	--	✓	Acetic acid, 2-fluoro-2-[1,1,2,3,3,3-hexafluoro-2-(1,1,2,2-tetrafluoro-2-sulfoethoxy)propoxy]-	2416366-19-1	C7H3F11O7S
	NVHOS	✓	✓	1,1,2,2,4,5,5,5-heptafluoro-3-oxapentanesulfonic acid; or 2-(1,2,2,2-ethoxy)tetrafluoroethanesulfonic acid; or 1-(1,1,2,2-tetrafluoro-2-sulfoethoxy)-1,2,2,2-tetafluoroethane	801209-99-4	C4H2F8O4S
	PES	✓	✓	Perfluoro-2-ethoxyethanesulfonic acid	113507-82-7	C4HF9O4S
	PS Acid	✓	✓	Ethanesulfonic acid, 2-[1-[difluoro[(1,2,2-trifluoroethenyl)oxy]methyl]-1,2,2,2-tetrafluoroethoxy]-1,1,2,2-tetrafluoro-	29311-67-9	C7HF13O5S
	Hydro-PS Acid	✓	✓	Ethanesulfonic acid, 2-[1-[difluoro(1,2,2,2-tetrafluoroethoxy)methyl]-1,2,2,2-tetrafluoroethoxy]-1,1,2,2-tetrafluoro-	749836-20-2	C7H2F14O5S
	PFHpA[2]	--	--	Perfluoroheptanoic acid	375-85-9	C7HF13O2

Notes:
1 - Analyzed under analytical method Table 3+ Lab SOP.
2 - HFPO-DA and PFHpA can be analyzed under methods Table 3+ SOP and EPA Method 537 Mod.
CASRN - Chemical Abstracts Service registry number
EPA - Environmental Protection Agency
PFAS - Per- and Polyfluoroalkyl substances
SOP - Standard Operating Procedure

TABLE 3
ANALYTICAL RESULTS - JULY AND AUGUST 2021
Chemours Fayetteville Works, North Carolina

Location ID	STS Influent	STS Discharge	STS Influent	STS Discharge	STS Discharge	STS Influent	STS Discharge	STS Discharge
Field Sample ID	STS Influent- 070221	STS Discharge - 070221	STS Influent-10708	STS Discharge 10708	STS-Discharge-D-10708	STS Influent-10719	STS Discharge-10719	STS Discharge-10719-D
Sample Date	07/02/2021	07/02/2021	07/08/2021	07/08/2021	07/08/2021	07/19/2021	07/19/2021	07/19/2021
Analytical Laboratory	TestAmerica	TestAmerica	TestAmerica	TestAmerica	TestAmerica	TestAmerica	TestAmerica	TestAmerica
QA/QC	--	--	--	--	Field Duplicate	--	--	Field Duplicate
Table 3+ SOP (ng/L)								
Hfpo Dimer Acid	**18,000 J**	**3**	**27,000 J**	<2.0	<2.0	**34,000 J**	**3.3**	--
PFMOAA	**11,000 J**	**110**	**4,300 J**	<2.0	<2.0	**5,800**	<2.0	--
PMPA	**1,100**	<10	**1,200 J**	<10	<10	**1,400**	<10	--
Other Compounds (mg/L)								
Total Suspended Solids	--	**10 J**	--	**15**	--	--	**3.8**	**3.9**

Notes

Bold - Analyte detected above associated reporting limit.

J - Analyte detected. Reported value may not be accurate or precise

mg/L - milligrams per liter

ng/L - nanograms per liter

QA/QC - Quality assurance/ quality control

SOP - standard operating procedure

STS - Stormwater Treatment System

-- - No data reported

< - Analyte not detected above associated reporting limit.

TABLE 3
ANALYTICAL RESULTS - JULY AND AUGUST 2021
Chemours Fayetteville Works, North Carolina

Location ID	STS Influent	STS Discharge	STS Influent	STS Discharge	STS Influent	STS Discharge	STS Influent	STS Discharge
Field Sample ID	STS Influent - 10804	STS Discharge - 10804	STS Influent-081021	STS Discharge-081021	STS Influent-081821	STS Discharge-081821	STS Influent - 082221	STS Discharge - 082221
Sample Date	08/04/2021	08/04/2021	08/10/2021	08/10/2021	08/18/2021	08/18/2021	08/22/2021	08/22/2021
Analytical Laboratory	TestAmerica	TestAmerica	TestAmerica	TestAmerica	TestAmerica	TestAmerica	TestAmerica	TestAmerica
QA/QC	--	--	--	--	--	--	--	--
Table 3+ SOP (ng/L)								
Hfpo Dimer Acid	**42,000 J**	<2.0	**21,000 J**	<2.0	**22,000**	<2.0	**38,000 J**	<2.0
PFMOAA	**4,600 J**	<2.0	**5,800 J**	<2.0	**5,600**	<2.0	**6,300 J**	<2.0
PMPA	**2,000 J**	<10	**1,300 J**	<10	**1,400**	<10	**1,300 J**	<10
Other Compounds (mg/L)								
Total Suspended Solids	--	**8.6**	--	**6.2**	--	**6.3**	--	**8.2 J**

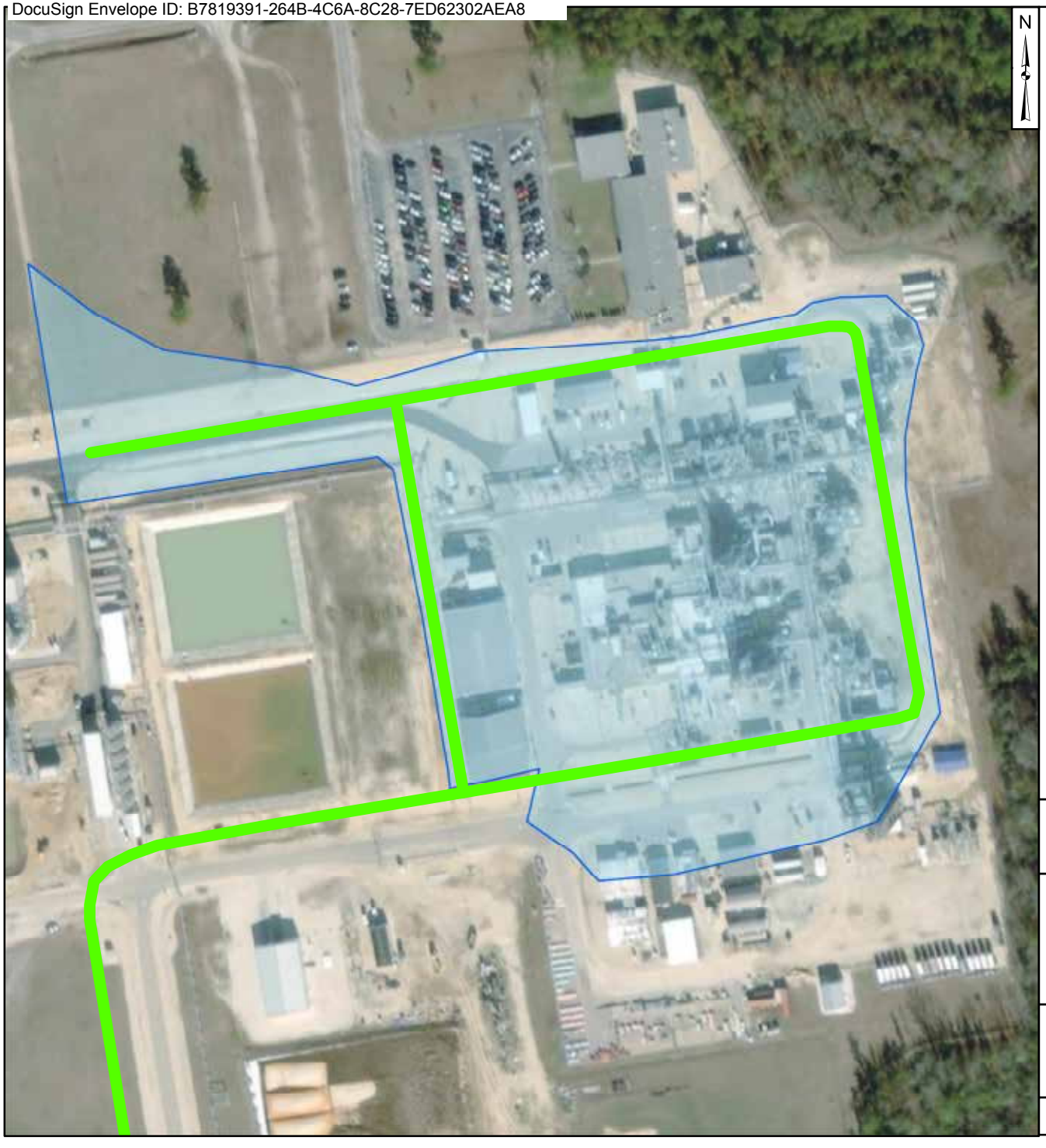
Notes
Bold - Analyte detected above associated reporting limit.
J - Analyte detected. Reported value may not be accurate or precise
mg/L - milligrams per liter
ng/L - nanograms per liter
QA/QC - Quality assurance/ quality control
SOP - standard operating procedure
STS - Stormwater Treatment System
-- - No data reported
< - Analyte not detected above associated reporting limit.

TABLE 4
FIELD PARAMETERS - JULY AND AUGUST 2021
Chemours Fayetteville Works, North Carolina

Date	Location	Sampling Method	Sample Start Time	Sample End Time	pH (SU)		Temperature (°C)		Specific Conductivity (µS/cm)		Turbidity (NTU)		Water Color	Water Odor
					Start	End	Start	End	Start	End	Start	End		
7/2/2021	Influent	Temporal Composite	12:45	18:30	6.8	6.5	26.0	16.7	85.4	85.8	48	47	Brownish	None
	Effluent	Temporal Composite	13:00	18:30	6.9	7.0	26.0	16.1	81.9	73.2	26	24	Brownish but more clear than influent	None
7/8/2021	Influent	Temporal Composite	9:50	17:50	6.6	5.7	25.0	16.0	49.2	73.6	67	55	Brown	None
	Effluent	Temporal Composite	10:00	17:50	7.7	7.4	25.0	16.0	50.4	48.2	34	32	Mostly clear	None
7/19/2021	Influent	Temporal Composite	9:30	15:00	6.5	6.5	27.0	16.0	71.4	72.1	20	21	Colorless	None
	Effluent	Temporal Composite	9:30	15:00	7.5	7.4	27.0	16.0	67.4	68.2	9	10	Colorless	None
8/4/2021	Influent	Temporal Composite	9:40	10:40	6.9	6.9	29.0	20.0	97.1	86.5	11	12	Brown	None
	Effluent	Temporal Composite	9:40	10:40	6.8	6.7	29.0	20.0	89.6	90.2	13	12	Brown	None
8/10/2021	Influent	Temporal Composite	9:40	17:30	6.3	6.3	28.0	16.0	48.7	49.1	12	13	NR	NR
	Effluent	Temporal Composite	9:40	17:30	6.7	6.8	28.0	16.0	62.9	60.3	10	10	NR	NR
8/18/2021	Influent	Temporal Composite	9:40	15:30	6.8	6.8	27.0	18.0	76.5	82.4	8	10	Colorless	None
	Effluent	Temporal Composite	9:40	15:30	6.7	6.8	27.0	18.0	126.5	103.2	14	12	Colorless	None
8/22/2021	Influent	Temporal Composite	11:00	17:00	6.7	6.6	26.1	19.2	65.3	61.2	7	7	Colorless	None
	Effluent	Temporal Composite	11:00	17:00	6.6	6.5	26.5	17.8	93.6	76.4	7	20	Yellow	None

Notes:
°C - degrees Celsius
µS/cm - microSiemens per centimeter
NR - not recorded
NTU - nephelometric turbidity units
ORP - oxidation reduction potential
SU - standard units
Field parameters for the temporal composite samples were collected once at the beginning of sampling and once from the sample reservoir at the end of composite sampling.

FIGURES



Legend

Site Conveyance Network

Drainage Area to the Stormwater Treatment System

200 100 0 200 Feet

Drainage to the Proposed Stormwater Treatment System

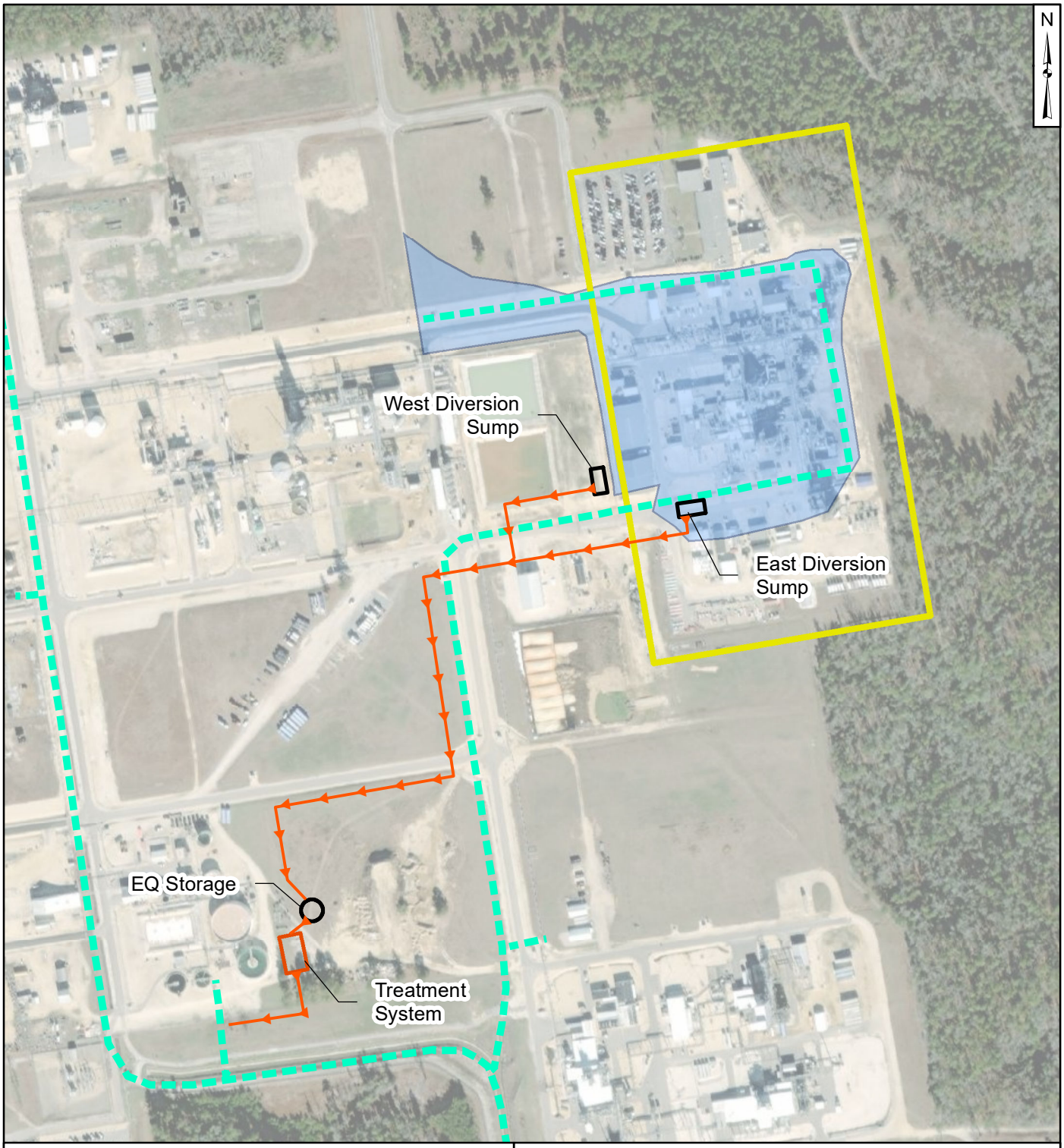
Chemours Fayetteville Works, North Carolina

Geosyntec consultants

Geosyntec Consultants of NC, P.C.
NC License No.: C 3500 and C 295

Raleigh | September 2021

Figure 1



Legend

- Pipe to Convey Captured Stormwater to Stormwater Treatment System
- Site Conveyance Network
- Stormwater Treatment System
- Drainage Area to the Stormwater Treatment System

Areas at Site

- Chemours Monomers/IXM

Notes
EQ - equalization
1. Basemap sources: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

500 250 0 500 Feet

Approximate Location of Diversion Sumps, EQ Storage, and Stormwater Treatment System

Chemours Fayetteville Works, North Carolina

Geosyntec consultants

Geosyntec Consultants of NC, P.C.
NC License No.: C 3500 and C 295

Raleigh | September 2021

Figure 2

APPENDIX A

Laboratory Reports and Data Review Narrative Whitebooks

Laboratory reports are provided to NCDEQ via the Shared OneDrive Folder

ADQM Data Review

Site: Chemours Fayetteville

Project: STS Compliance Sampling July 2021

Project Reviewer: Bridget Gavaghan

Sample Summary

Field Sample ID	Lab Sample ID	Sample Matrix	Filtered	Sample Date	Sample Time	Sample Purpose
DISCHARGE - 070221	410-46448-1	Other liquid	N	07/02/2021	18:30	FS
STS Influent- 070221	410-46449-1	Other liquid	N	07/02/2021	18:30	FS
STS DISCHARGE - 070221	410-46449-2	Other liquid	N	07/02/2021	18:30	FS
STS Discharge 10708	410-46707-1	Other liquid	N	07/08/2021	17:50	FS
STS Influent-10708	410-46711-1	Other liquid	N	07/08/2021	17:50	FS
STS Discharge 10708	410-46711-2	Other liquid	N	07/08/2021	17:50	FS
STS-Discharge-D-10708	410-46711-3	Other liquid	N	07/08/2021	17:50	DUP
STS Discharge-10719	410-48282-1	Other liquid	N	07/19/2021	15:00	FS
STS Discharge-10719-D	410-48282-2	Other liquid	N	07/19/2021	15:00	DUP
STS Influent-10719	410-48284-1	Other liquid	N	07/19/2021	15:00	FS
STS Discharge-10719	410-48284-2	Other liquid	N	07/19/2021	15:00	FS

* FS=Field Sample
DUP=Field Duplicate
FB=Field Blank
EB=Equipment Blank
TB=Trip Blank

Analytical Protocol

Lab Name	Lab Method	Parameter Category	Sampling Program
LANCASTER LABORATORIES	2540 D-2011	Total Suspended Solids	STS Compliance Sampling
LANCASTER LABORATORIES	Cl. Spec. Table 3 Compound SOP	Per- and Polyfluorinated Alkyl Substances (PFAS)	STS Compliance Sampling

ADQM Data Review Checklist

Item	Description	Yes	No*	Not Applicable (NA)*	DVM Narrative Report	Laboratory Report	Exception Report (ER) #
A	Did samples meet laboratory acceptability requirements upon receipt (i.e., intact, within temperature, properly preserved, and no headspace where applicable)?		X			X	
B	Were samples received by the laboratory in agreement with the associated chain of custody?	X					
C	Was the chain of custody properly completed by the laboratory and/or field team?	X					
D	Were samples prepped/analyzed by the laboratory within method holding times?		X		X	X	
E	Were QA/QC criteria met by the laboratory (method blanks, LCSs/LCSDs, MSs/MSDs, PDSs, SDs, duplicates/replicates, surrogates, total/dissolved differences/RPDs, sample results within calibration range)?		X		X	X	
F	Were detections in field/equipment/trip blanks at levels not requiring sample data qualification?	X					
G	Were all data usable and not R qualified?	X					
ER#	**Description**						
Other QA/QC Items to Note:							

* See DVM Narrative Report, Lab Report, and/or ER # for further details as indicated.

The electronic data submitted for this project was reviewed via the Data Verification Module (DVM) process. Overall, the data is acceptable for use without qualification, except as noted on the attached DVM Narrative Report.

The lab reports due to a large page count are stored on a network shared drive and are available to be posted on external shared drives, or on a flash drive

Data Verification Module (DVM)

The DVM is an internal review process used by the ADQM group to assist with the determination of data usability. The electronic data deliverables received from the laboratory are loaded into the Locus EIM™ database and processed through a series of data quality checks, which are a combination of software (Locus EIM™ database Data Verification Module (DVM)) and manual reviewer evaluations. The data is evaluated against the following data usability checks:

- Field and laboratory blank contamination
- US EPA hold time criteria
- Missing Quality Control (QC) samples
- Matrix spike (MS)/matrix spike duplicate (MSD) recoveries and the relative percent differences (RPDs) between these spikes
- Laboratory control sample (LCS)/laboratory control sample duplicate (LCSD) recoveries and the RPD between these spikes
- Surrogate spike recoveries for organic analyses
- Difference/RPD between field duplicate sample pairs
- RPD between laboratory replicates for inorganic analyses
- Difference/percent difference between total and dissolved sample pairs

There are two qualifier fields in EIM:

Lab Qualifier is the qualifier assigned by the lab and may not reflect the usability of the data. This qualifier may have many different meanings and can vary between labs and over time within the same lab. Please refer to the laboratory report for a description of the lab qualifiers. As they are lab descriptors they are not to be used when evaluating the data.

Validation Qualifier is the 3rd party formal validation qualifier if this was performed. Otherwise this field contains the qualifier resulting from the ADQM DVM review process. This qualifier assesses the usability of the data and may not equal the lab qualifier. The DVM applies the following data evaluation qualifiers to analysis results, as warranted:

Qualifier	Definition
B	Not detected substantially above the level reported in the laboratory or field blanks.
R	Unusable result. Analyte may or may not be present in the sample.
J	Analyte present. Reported value may not be accurate or precise.
UJ	Not detected. Reporting limit may not be accurate or precise.

The **Validation Status Code** field is set to “DVM” if the ADQM DVM process has been performed. If the DVM has not been run, the field will be blank.

If the DVM has been run (**Validation Status Code** equals “DVM”), use the **Validation Qualifier.**

If the data has been validated by a third party, the field **“Validated By”** will be set to the validator (e.g., ESI for Environmental Standards, Inc.).

DVM Narrative Report

Site: Fayetteville **Sampling Program:** STS Compliance Sampling **Validation Options:** LABSTATS

Validation Reason Only one surrogate has relative percent recovery (RPR) values outside control limits and the parameter is a PFC (Detects).

Field Sample ID	Date Sampled	Lab Sample ID	Analyte	Result	Units	Type	MDL	PQL	Validation Qualifier	Analytical Method	Pre-prep	Prep
STS Influent- 070221	07/02/2021	410-46449-1	Hfpo Dimer Acid	18	UG/L	PQL		0.20	J	Cl. Spec. Table 3 Compound SOP		PFAS_DI_Prep
STS Influent- 070221	07/02/2021	410-46449-1	PFMOAA	11	ug/L	PQL		0.20	J	Cl. Spec. Table 3 Compound SOP		PFAS_DI_Prep
STS Influent-10708	07/08/2021	410-46711-1	Pentamethylphosphoramide (PMPA)	1.2	UG/L	PQL		0.10	J	Cl. Spec. Table 3 Compound SOP		PFAS_DI_Prep
STS Influent-10708	07/08/2021	410-46711-1	Hfpo Dimer Acid	27	UG/L	PQL		0.20	J	Cl. Spec. Table 3 Compound SOP		PFAS_DI_Prep
STS Influent-10708	07/08/2021	410-46711-1	PFMOAA	4.3	ug/L	PQL		0.020	J	Cl. Spec. Table 3 Compound SOP		PFAS_DI_Prep
STS Influent-10719	07/19/2021	410-48284-1	Hfpo Dimer Acid	34	UG/L	PQL		0.20	J	Cl. Spec. Table 3 Compound SOP		PFAS_DI_Prep

Site: Fayetteville **Sampling Program:** STS Compliance Sampling **Validation Options:** LABSTATS

Validation Reason The analysis hold time for this sample was exceeded. The reported result may be biased low.

Field Sample ID	Date Sampled	Lab Sample ID	Analyte	Result	Units	Type	MDL	PQL	Validation Qualifier	Analytical Method	Pre-prep	Prep
DISCHARGE - 070221	07/02/2021	410-46448-1	Total Suspended Solids	10	MG/L	MDL	1	3	J	2540 D-2011		

ADQM Data Review

Site: Chemours Fayetteville

Project: STS Compliance Sampling August 2021

Project Reviewer: Bridget Gavaghan

Sample Summary

Field Sample ID	Lab Sample ID	Sample Matrix	Filtered	Sample Date	Sample Time	Sample
STS Influent - 10804	410-50456-1	Other liquid	N	08/04/2021	10:40	FS
STS Discharge - 10804	410-50456-2	Other liquid	N	08/04/2021	10:40	FS
STS Discharge - 10804	410-50457-1	Other liquid	N	08/04/2021	10:40	FS
STS Influent-081021	410-51155-1	Other liquid	N	08/10/2021	17:30	FS
STS Discharge-081021	410-51155-2	Other liquid	N	08/10/2021	17:30	FS
STS Discharge-081021	410-51209-1	Other liquid	N	08/10/2021	17:30	FS
STS Influent-081821	410-52084-1	Other liquid	N	08/18/2021	15:30	FS
STS Discharge-081821	410-52084-2	Other liquid	N	08/18/2021	15:30	FS
STS Discharge-081821	410-52100-1	Other liquid	N	08/18/2021	15:30	FS
STS Influent - 082221	410-52976-1	Other liquid	N	08/22/2021	17:00	FS
STS Discharge - 082221	410-52976-2	Other liquid	N	08/22/2021	17:00	FS
STS Discharge - 082221	410-53002-1	Other liquid	N	08/22/2021	17:00	FS

* FS=Field Sample
DUP=Field Duplicate
FB=Field Blank
EB=Equipment Blank
TB=Trip Blank

Analytical Protocol

Lab Name	Lab Method	Parameter Category	Sampling Program
LANCASTER LABORATORIES	2540 D-2011	Total Suspended Solids	STS Compliance Sampling
LANCASTER LABORATORIES	Cl. Spec. Table 3 Compound SOP	Per- and Polyfluorinated Alkyl Substances (PFAS)	STS Compliance Sampling

ADQM Data Review Checklist

Item	Description	Yes	No*	Not Applicable (NA)*	DVM Narrative Report	Laboratory Report	Exception Report (ER) #
A	Did samples meet laboratory acceptability requirements upon receipt (i.e., intact, within temperature, properly preserved, and no headspace where applicable)?	X					
B	Were samples received by the laboratory in agreement with the associated chain of custody?		X			X	
C	Was the chain of custody properly completed by the laboratory and/or field team?	X					
D	Were samples prepped/analyzed by the laboratory within method holding times?		X		X	X	
E	Were QA/QC criteria met by the laboratory (method blanks, LCSs/LCSDs, MSs/MSDs, PDSs, SDs, duplicates/replicates, surrogates, total/dissolved differences/RPDs, sample results within calibration range)?		X		X	X	
F	Were detections in field/equipment/trip blanks at levels not requiring sample data qualification?	X					
G	Were all data usable and not R qualified?	X					
ER#	**Description**						
Other QA/QC Items to Note:							

* See DVM Narrative Report, Lab Report, and/or ER # for further details as indicated.

The electronic data submitted for this project was reviewed via the Data Verification Module (DVM) process. Overall, the data is acceptable for use without qualification, except as noted on the attached DVM Narrative Report.

The lab reports due to a large page count are stored on a network shared drive and are available to be posted on external shared drives, or on a flash drive

Data Verification Module (DVM)

The DVM is an internal review process used by the ADQM group to assist with the determination of data usability. The electronic data deliverables received from the laboratory are loaded into the Locus EIM™ database and processed through a series of data quality checks, which are a combination of software (Locus EIM™ database Data Verification Module (DVM)) and manual reviewer evaluations. The data is evaluated against the following data usability checks:

- Field and laboratory blank contamination
- US EPA hold time criteria
- Missing Quality Control (QC) samples
- Matrix spike (MS)/matrix spike duplicate (MSD) recoveries and the relative percent differences (RPDs) between these spikes
- Laboratory control sample (LCS)/laboratory control sample duplicate (LCSD) recoveries and the RPD between these spikes
- Surrogate spike recoveries for organic analyses
- Difference/RPD between field duplicate sample pairs
- RPD between laboratory replicates for inorganic analyses
- Difference/percent difference between total and dissolved sample pairs

There are two qualifier fields in EIM:

Lab Qualifier is the qualifier assigned by the lab and may not reflect the usability of the data. This qualifier may have many different meanings and can vary between labs and over time within the same lab. Please refer to the laboratory report for a description of the lab qualifiers. As they are lab descriptors they are not to be used when evaluating the data.

Validation Qualifier is the 3rd party formal validation qualifier if this was performed. Otherwise this field contains the qualifier resulting from the ADQM DVM review process. This qualifier assesses the usability of the data and may not equal the lab qualifier. The DVM applies the following data evaluation qualifiers to analysis results, as warranted:

Qualifier	Definition
B	Not detected substantially above the level reported in the laboratory or field blanks.
R	Unusable result. Analyte may or may not be present in the sample.
J	Analyte present. Reported value may not be accurate or precise.
UJ	Not detected. Reporting limit may not be accurate or precise.

The **Validation Status Code** field is set to “DVM” if the ADQM DVM process has been performed. If the DVM has not been run, the field will be blank.

If the DVM has been run (**Validation Status Code** equals “DVM”), use the **Validation Qualifier.**

If the data has been validated by a third party, the field **“Validated By”** will be set to the validator (e.g., ESI for Environmental Standards, Inc.).

DVM Narrative Report

Site: Fayetteville **Sampling Program:** STS Compliance Sampling **Validation Options:** LABSTATS

Validation Reason Only one surrogate has relative percent recovery (RPR) values outside control limits and the parameter is a PFC (Detects).

Field Sample ID	Date Sampled	Lab Sample ID	Analyte	Result	Units	Type	MDL	PQL	Validation Qualifier	Analytical Method	Pre-prep	Prep
STS Influent - 082221	08/22/2021	410-52976-1	Pentamethylphosphoramide (PMPA)	1.3	UG/L	PQL		0.010	J	Cl. Spec. Table 3 Compound SOP		PFAS_DI_Prep
STS Influent - 082221	08/22/2021	410-52976-1	Hfpo Dimer Acid	38	UG/L	PQL		0.20	J	Cl. Spec. Table 3 Compound SOP		PFAS_DI_Prep
STS Influent - 082221	08/22/2021	410-52976-1	PFMOAA	6.3	ug/L	PQL		0.20	J	Cl. Spec. Table 3 Compound SOP		PFAS_DI_Prep
STS Influent - 10804	08/04/2021	410-50456-1	Pentamethylphosphoramide (PMPA)	2.0	UG/L	PQL		0.10	J	Cl. Spec. Table 3 Compound SOP		PFAS_DI_Prep
STS Influent - 10804	08/04/2021	410-50456-1	Hfpo Dimer Acid	42	UG/L	PQL		0.20	J	Cl. Spec. Table 3 Compound SOP		PFAS_DI_Prep
STS Influent - 10804	08/04/2021	410-50456-1	PFMOAA	4.6	ug/L	PQL		0.020	J	Cl. Spec. Table 3 Compound SOP		PFAS_DI_Prep
STS Influent-081021	08/10/2021	410-51155-1	Pentamethylphosphoramide (PMPA)	1.3	UG/L	PQL		0.010	J	Cl. Spec. Table 3 Compound SOP		PFAS_DI_Prep
STS Influent-081021	08/10/2021	410-51155-1	Hfpo Dimer Acid	21	UG/L	PQL		0.20	J	Cl. Spec. Table 3 Compound SOP		PFAS_DI_Prep
STS Influent-081021	08/10/2021	410-51155-1	PFMOAA	5.8	ug/L	PQL		0.20	J	Cl. Spec. Table 3 Compound SOP		PFAS_DI_Prep

Site: Fayetteville **Sampling Program:** STS Compliance Sampling **Validation Options:** LABSTATS

Validation Reason The analysis hold time for this sample was exceeded. The reported result may be biased low.

Field Sample ID	Date Sampled	Lab Sample ID	Analyte	Result	Units	Type	MDL	PQL	Validation Qualifier	Analytical Method	Pre-prep	Prep
STS Discharge - 082221	08/22/2021	410-53002-1	Total Suspended Solids	8.2	MG/L	MDL	1	3	J	2540 D-2011		

APPENDIX B

Monthly Monitoring Reports for July through August 2021

DocuSign Envelope ID: B7819391-264B-4C6A-8C28-7ED62302AEA8

Month: July **Year:** 2021

Facility: Chemours Company-Fayetteville Works **Class:** Pending **County:** Bladen

ORC: Jamie R. Lewis **Grade:** Pending **ORC Certification #** 994529

Has ORC Changed?: ☐ **Phone:** 910-678-1219

Certifed Lab Name: Eurofins Lancaster Laboratories Environmental **Lab#:** 521

Person(s) Collecting samples: Facility staff

Comments:
1. Non-detect influent and effluent sample results were assigned a value of zero for the calculation and the values from duplicate samples were averaged together.
2. Monthly average influent and effluent concentrations are volume-weighted based on "Average Calculations" worksheet.
3. Permit and discharge numbers pending per application submitted on June 4, 2021.

Sampling Location: Influent **Discharge #** Pending

Date	Composite/ Sample Start Time	Composite/ Sample End Time	Total Composite Time	Precipitation	50050 Influent to EQ Storage	50050 Influent to Treatment System	Influent Volumetric Weighting Factor	52612 HFPO-DA	52613 PFMOAA	52620 PMPA
	2400 clock	2400 clock	Hrs	inches	mgd	mgd		ug/l	ug/l	ug/l
1				0.01						
2	1245	1830	5.75	0.77	0.201	0.104	0.28	18	11	1.1
3						0.102				
4										
5										
6										
7				0.34	0.030	0.026				
8	0950	1750	8.00	2.16	0.338	0.155	0.42	27	4.3	1.2
9				0.02	0.059	0.151				
10										
11				0.16	0.007					
12										
13										
14										
15				0.30	0.001	0.068				
16										
17				0.73	0.080					
18				0.05	0.039	0.031				
19	0930	1500	5.50	4.33	0.336	0.107	0.29	34	5.8	1.4
20				0.03	0.013	0.150				
21				0.08	0.025					
22										
23										
24										
25										
26										
27				0.06	0.009					
28										
29										
30										
31										
Composite(CP)/Grab(GR):					RC	RC		CP	CP	CP

Monthly Average Limit:							
Monthly Average:	0.29	0.037	0.029		26	6.6	1.2
Daily Maximum:	4.33	0.338	0.155	0.42	34	11	1.4
Daily Minimum:	0.01	0.001	0.026	0.28	18	4.3	1.1

DocuSign Envelope ID: B7819391-264B-4C6A-8C28-7ED62302AEA8

Month: July **Year:** 2021

Facility: Chemours Company-Fayetteville Works **Class:** TBD **County:** Bladen

ORC: Jamie R. Lewis **Grade:** Pending **ORC Certification #** 994529

Has ORC Changed?: ☐ **Phone:** 910-678-1219

Certifed Lab Name: Eurofins Lancaster Laboratories Environmental **Lab#:** 521

Person(s) Collecting samples: Facility staff

Comments: 1. Non-detect influent and effluent sample results were assigned a value of zero for the calculation and the values from duplicate samples were averaged together.
2. Monthly average influent and effluent concentrations are volume-weighted based on "Average Calculations" worksheet.

Sampling Location: Effluent **Discharge #** Pending

Date				50050		52612	52613	52620	00400	CO530								
	Composite/ Sample Start Time	Composite/ Sample End Time	Total Composite Time	Discharge from Treatment System	Effluent Volumetric Weighting Factor	HFPO-DA	PFMOAA	PMPA	pH	Total Suspended Solids								
	2400 clock	2400 clock	Hrs	mgd		ug/l	ug/l	ug/l	su	mg/l								
1				No Discharge														
2	1300	1830	5.50	0.104	0.28	0.003	0.11	< 0.010	7.0	10								
3				0.102														
4				No Discharge														
5				No Discharge														
6				No Discharge														
7				0.026														
8	1000	1750	7.83	0.155	0.42	< 0.002	< 0.002	< 0.010	7.4	15								
9				0.151														
10				No Discharge														
11				No Discharge														
12				No Discharge														
13				No Discharge														
14				No Discharge														
15				0.068														
16				No Discharge														
17				No Discharge														
18				0.031														
19	0930	1500	5.50	0.107	0.29	0.0033	< 0.002	< 0.010	7.4	3.8								
20				0.150														
21				No Discharge														
22				No Discharge														
23				No Discharge														
24				No Discharge														
25				No Discharge														
26				No Discharge														
27				No Discharge														
28				No Discharge														
29				No Discharge														
30				No Discharge														
31				No Discharge														
			Composite(CP)/Grab(GR):	RC		CP	CP	CP	GR	CP								

Monthly Average Limit:										
Monthly Average:	0.029		0.002	0.031	0.000					
Daily Maximum:	0.155	0.42	0.003	0.110	0.000	7.0	3.8			
Daily Minimum:	0.026	0.28	0.0033	0.110	0.000	7.4	15			
Monthly Avg % Removal (99%):			99.99	99.53	100.00					

DocuSign Envelope ID: B7819391-264B-4C6A-8C28-7ED62302AEA8

Month: July **Year:** 2021

Facility: Chemours Company-Fayetteville Works **Class:** Pending **County:** Bladen

ORC: Jamie R. Lewis **Grade:** Pending **ORC Certification #** 994529

Has ORC Changed?: ☐ **Phone:** 910-678-1219

Certifed Lab Name: Eurofins Lancaster Laboratories Environmental **Lab#:** 521

Person(s) Collecting samples: Facility staff

Comments: 1. See SWTS report for development of bypass flow estimates.
2. Permit and discharge numbers are pending per application submitted on June 4, 2021.

Sampling Location: Bypass **Discharge #** Pending

Date	East Sump Grab Sample Start Time	West Sump Grab Sample Time	Precipitation	50050 Estimated Runoff Volume from SWMM	50050 Volume of Stormwater Transferred to EQ Storage	50050 Estimated Bypass Flow	East Bypass Total Table 3+ (Total of 20 Compounds)	East Bypass Total Table 3+ (Total of 20 Compounds)											
	2400 clock	2400 clock	inches	mgd	mgd	mgd	ug/l	ug/l											
1			0.01																
2			0.77	0.234	0.201	0.033													
3																			
4																			
5																			
6																			
7			0.34		0.030														
8			2.16	0.699	0.338	0.361													
9			0.02		0.059														
10																			
11			0.16		0.007														
12																			
13																			
14																			
15			0.30		0.001														
16																			
17			0.73		0.080														
18			0.05		0.039														
19			4.33	1.450	0.336	1.114													
20			0.03		0.013														
21			0.08		0.025														
22																			
23																			
24																			
25																			
26																			
27			0.06		0.009														
28																			
29																			
30																			
31																			
Composite(C)/Grab(G):				**RC**	**RC**	**RC**	**GR**	**GR**											

Monthly Average Limit:	
Monthly Average:	0.29
Daily Maximum:	4.33
Daily Minimum:	0.01
Monthly Avg % Removal (99%):	

EQUATION 1: SYSTEM REMOVAL EFFECTIVENESS FOR INDICATOR PARAMETERS CALCULATIONS

Date	Sample Number	Inputs for July 2021 Monthly Evaluation Period									
		Influent Concentration			Influent Volume	Effluent Concentration			Effluent Volume	Influent Concentration Volumetric Weighting Factor	Effluent Concentration Volumetric Weighting Factor
		HFPO-DA (i)	PFMOAA (i)	PMPA (i)		HFPO-DA (i)	PFMOAA (i)	PMPA (i)			
	m, n	$c_{inf,n,HFPO-DA}$	$c_{inf,n,PFMOAA}$	$c_{inf,n,PMPA}$	V_n	$c_{eff,m,HFPO-DA}$	$c_{eff,m,PFMOAA}$	$c_{eff,m,PMPA}$	V_m	w_n	w_m
	-	µg/L	µg/L	µg/L	mgd	µg/L	µg/L	µg/L	mgd	-	-
7/2/2021	1	18	11	1.1	0.104	0.003	0.110	< 0.010	0.104	0.28	0.28
7/8/2021	2	27	4.3	1.2	0.155	< 0.002	< 0.002	< 0.010	0.155	0.42	0.42
7/19/2021	3	34	5.8	1.4	0.107	0.003	< 0.002	< 0.010	0.107	0.29	0.29
	4										

Results for July 2021 Monthly Evaluation Period								
Volume-weighted Influent Concentration			Volume-weighted Effluent Concentration			Treatment System PFAS Removal Efficiency for HFPO-DA, PFMOAA, and PMPA		
$c_{inf,HFPO-DA}$	$c_{inf,PFMOAA}$	$c_{inf,PMPA}$	$c_{eff,HFPO-DA}$	$c_{eff,PFMOAA}$	$c_{eff,PMPA}$	$E_{TS-IXM-HFPO-DA}$	$E_{TS-IXM-PFMOAA}$	$E_{TS-IXM-PMPA}$
µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	%	%	%
26	**6.6**	**1.2**	**0.002**	**0.031**	**0.000**	**99.99**	**99.53**	**100.00**

Notes:
1. Equation 1: System Removal Effectiveness for Indicator Compounds is referenced in the Stormwater Treatment System Sampling Plan (Geosyntec, 2021).
2. Non-detect influent and effluent sample results are assigned a value of zero for the calculation and the values from duplicate samples are averaged together.

Acronyms:
< : less than the minimum detection limit
µg/L: micrograms per liter
mgd: million gallons per day
HFPO-DA: hexafluoropropylene oxide dimer acid
PFMOAA: 2,2-difluoro-2-(trifluoromethoxy) acetic acid
PMPA: perfluoromethoxypropyl carboxylic acid

DocuSign Envelope ID: B7819391-264B-4C6A-8C28-7ED62302AEA8

Month: August **Year:** 2021

Facility: Chemours Company-Fayetteville Works **Class:** Pending **County:** Bladen

ORC: Jamie R. Lewis **Grade:** Pending **ORC Certification #** 994529

Has ORC Changed?: ☐ **Phone:** 910-678-1219

Certifed Lab Name: Eurofins Lancaster Laboratories Environmental **Lab#:** 521

Person(s) Collecting samples: Facility staff

Comments:
1. Non-detect influent and effluent sample results were assigned a value of zero for the calculation and the values from duplicate samples were averaged together.
2. Monthly average influent and effluent concentrations are volume-weighted based on "Average Calculations" worksheet.
3. Permit and discharge numbers pending per application submitted on June 4, 2021.

Sampling Location: Influent **Discharge #** Pending

Date	Composite/ Sample Start Time	Composite/ Sample End Time	Total Composite Time	Precipitation	50050 Influent to EQ Storage	50050 Influent to Treatment System	Influent Volumetric Weighting Factor	52612 HFPO-DA	52613 PFMOAA	52620 PMPA									
	2400 clock	2400 clock	Hrs	inches	mgd			ug/l	ug/l	ug/l									
1				0.26	0.029	0.025													
2				0.01	0.002	0.020													
3				0.34	0.051	0.010													
4	0940	1040	1.00	0.07	0.0087	0.030	0.09	42	4.6	2.0									
5																			
6				0.89	0.261														
7				0.05	0.002														
8																			
9						0.030													
10	940	1730	7.83	0.23	0.108	0.110	0.35	21	5.8	1.3									
11				0.10	0.008	0.161													
12						0.053													
13																			
14																			
15																			
16																			
17				0.31	0.063														
18	940	1530	5.83	0.29	0.060	0.104	0.33	22	5.6	1.4									
19				0.23	0.032														
20																			
21																			
22	1100	1700	6.00			0.072	0.23	38	6.3	1.3									
23						0.023													
24																			
25																			
26																			
27																			
28																			
29																			
30																			
31																			
Composite(CP)/Grab(GR):					**RC**	**RC**		**CP**	**CP**	**CP**									

Monthly Average Limit:																		
Monthly Average:	0.09	0.020	0.021		27	5.7	1.4											
Daily Maximum:	0.89	0.261	0.161	0.35	42	6	2.0											
Daily Minimum:	0.01	0.002	0.010	0.09	21	4.6	1.3											

DocuSign Envelope ID: B7819391-264B-4C6A-8C28-7ED62302AEA8

Month: August **Year:** 2021

Facility: Chemours Company-Fayetteville Works **Class:** Pending **County:** Bladen

ORC: Jamie R. Lewis **Grade:** Pending **ORC Certification #** 994529

Has ORC Changed?: ☐ **Phone:** 910-678-1219

Certifed Lab Name: Eurofins Lancaster Laboratories Environmental **Lab#:** 521

Person(s) Collecting samples: Facility staff

Comments:
1. Non-detect influent and effluent sample results were assigned a value of zero for the calculation and the values from duplicate samples were averaged together.
2. Monthly average influent and effluent concentrations are volume-weighted based on "Average Calculations" worksheet.
3. Permit and discharge numbers pending per application submitted on June 4, 2021.

Sampling Location: Discharge **Discharge #** Pending

Date				50050		52612	52613	52620	00400	CO530								
	Composite/ Sample Start Time	Composite/ Sample End Time	Total Composite Time	Discharge from Treatment System	Effluent Volumetric Weighting Factor	HFPO-DA	PFMOAA	PMPA	pH	Total Suspended Solids								
	2400 clock	2400 clock	Hrs	mgd		ug/l	ug/l	ug/l	su	mg/l								
1				0.025														
2				0.020														
3				0.010														
4	0940	1040	1.00	0.030	0.09	< 0.002	< 0.002	< 0.010	6.7	8.6								
5				No Discharge														
6				No Discharge														
7				No Discharge														
8				No Discharge														
9				0.030														
10	940	1730	7.83	0.110	0.35	< 0.002	< 0.002	< 0.010	6.8	6.2								
11				0.161														
12				0.053														
13				No Discharge														
14				No Discharge														
15				No Discharge														
16				No Discharge														
17				No Discharge														
18	940	1530	5.83	0.104	0.33	< 0.002	< 0.002	< 0.010	6.8	6.3								
19				No Discharge														
20				No Discharge														
21				No Discharge														
22	1100	1700	6.00	0.072	0.23	< 0.002	< 0.002	< 0.010	6.6	8.2								
23				0.023														
24				No Discharge														
25				No Discharge														
26				No Discharge														
27				No Discharge														
28				No Discharge														
29				No Discharge														
30				No Discharge														
31				No Discharge														
Composite(CP)/Grab(GR):				**RC**		**CP**	**CP**	**CP**	**GR**	**CP**								
Monthly Average Limit:																		
Monthly Average:				0.021		0.000	0.000	0.000	6.71	7.3								
Daily Maximum:				0.161	0.35	0.000	0.000	0.000	6.55	6.2								
Daily Minimum:				0.010	0.09	0.000	0.000	0.000	6.79	8.6								
Monthly Avg % Removal (99%):						**100.0**	**100.0**	**100.0**										

DocuSign Envelope ID: B7819391-264B-4C6A-8C28-7ED62302AEA8

Month: August **Year:** 2021

Facility: Chemours Company-Fayetteville Works **Class:** Pending **County:** Bladen

ORC: Jamie R. Lewis **Grade:** Pending **ORC Certification #** 994529

Has ORC Changed?: ☐ **Phone:** 910-678-1219

Certifed Lab Name: Eurofins Lancaster Laboratories Environmental **Lab#:** 521

Person(s) Collecting samples: Facility staff

Comments: 1. See SWTS report for development of bypass flow estimates.
2. Permit and discharge numbers are pending per application submitted on June 4, 2021.

Sampling Location: Bypass **Discharge #** Pending

Date	East Sump Grab Sample Start Time	West Sump Grab Sample Time	Precipitation	50050 Estimated Runoff Volume from SWMM	50050 Volume of Stormwater Transferred to EQ Storage	50050 Estimated Bypass Flow	East Bypass Total Table 3+ (Total of 20 Compounds)	East Bypass Total Table 3+ (Total of 20 Compounds)											
	2400 clock	2400 clock	inches	mgd	mgd	mgd	ug/l	ug/l											
1			0.26		0.029														
2			0.01		0.002														
3			0.34		0.051														
4			0.07		0.009														
5																			
6			0.89		0.261														
7			0.05		0.002														
8																			
9																			
10			0.23		0.108														
11			0.10		0.008														
12																			
13																			
14																			
15																			
16																			
17			0.31		0.063														
18			0.29		0.060														
19			0.23		0.032														
20																			
21																			
22																			
23																			
24																			
25																			
26																			
27																			
28																			
29																			
30																			
31																			
Composite(C)/Grab(G):				**RC**	**RC**	**RC**	**GR**	**GR**											

Monthly Average Limit:																	
Monthly Average:	0.09																
Daily Maximum:	0.89																
Daily Minimum:	0.01																

EQUATION 1: SYSTEM REMOVAL EFFECTIVENESS FOR INDICATOR PARAMETERS CALCULATIONS

Date	Sample Number	Inputs for August 2021 Monthly Evaluation Period									
		Influent Concentration			Influent Volume	Efffluent Concentration			Effluent Volume	Influent Concentration Volumetric Weighting Factor	Effluent Concentration Volumetric Weighting Factor
		HFPO-DA (i)	PFMOAA (i)	PMPA (i)		HFPO-DA (i)	PFMOAA (i)	PMPA (i)			
	m, n	$c_{inf,n,HFPO-DA}$	$c_{inf,n,PFMOAA}$	$c_{inf,n,PMPA}$	V_n	$c_{eff,m,HFPO-DA}$	$c_{eff,m,PFMOAA}$	$c_{eff,m,PMPA}$	V_m	w_n	w_m
	-	µg/L	µg/L	µg/L	mgd	µg/L	µg/L	µg/L	mgd	-	-
8/4/2021	1	42	4.6	2.0	0.030	< 0.002	< 0.002	< 0.010	0.030	0.09	0.09
8/10/2021	2	21	5.8	1.3	0.110	< 0.002	< 0.002	< 0.010	0.110	0.35	0.35
8/18/2021	3	22	5.6	1.4	0.104	< 0.002	< 0.002	< 0.010	0.104	0.33	0.33
8/22/2021	4	38	6.3	1.3	0.072	< 0.002	< 0.002	< 0.010	0.072	0.23	0.23

Results for August 2021 Monthly Evaluation Period								
Volume-weighted Influent Concentration			Volume-weighted Effluent Concentration			Treatment System PFAS Removal Efficiency for HFPO-DA, PFMOAA, and PMPA		
$c_{inf,HFPO-DA}$	$c_{inf,PFMOAA}$	$c_{inf,PMPA}$	$c_{eff,HFPO-DA}$	$c_{eff,PFMOAA}$	$c_{eff,PMPA}$	$E_{TS-IXM-HFPO-DA}$	$E_{TS-IXM-PFMOAA}$	$E_{TS-IXM-PMPA}$
µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	%	%	%
27	**5.7**	**1.4**	**0.000**	**0.000**	**0.000**	**100.0**	**100.00**	**100.0**

Notes:
1. Equation 1: System Removal Effectiveness for Indicator Compounds is referenced in the Stormwater Treatment System Sampling Plan (Geosyntec, 2021).
2. Non-detect influent and effluent sample results are assigned a value of zero for the calculation and the values from duplicate samples are averaged together.

Acronyms:
< : less than the minimum detection limit
µg/L: micrograms per liter
mgd: million gallons per day
HFPO-DA: hexafluoropropylene oxide dimer acid
PFMOAA: 2,2-difluoro-2-(trifluoromethoxy) acetic acid
PMPA: perfluoromethoxypropyl carboxylic acid