


Division of Air Quality

January 10, 2019

MEMORANDUM

To: Heather Carter, Fayetteville Regional Supervisor

From: Gary L. Saunders, Stationary Source Compliance Branch 

Subject: The Chemours Company – Fayetteville Works
Fayetteville, Bladen County, North Carolina
Facility ID. No. 0900009, Permit No. 03735T43
Performance Testing for HFPO Dimer Acid (GenX) Conducted on June 12 and June 15, 2018 at Vinyl Ethers North Carbon Bed Adsorber and Polymer Processing Aid (PPA) Carbon Bed Adsorber by Weston Solutions, Inc.
Tracking No. 2018-167ST

Summary of GenX Test Program

Sources Tested

During the week of June 11, 2018, emissions testing was conducted on two process areas. The first process area tested was the Polymer Processing Aid (PPA) area. HFPO Dimer Acid Fluoride (HFPO DAF) produced in the VEN process is used to produce HFPO dimer acid (also known as GenX). There are a number of products that may be produced at PPA depending upon the raw materials and the final product needs. Process gases pass through the PPA scrubber which is a pH controlled packed bed scrubber. Chemours has added a carbon bed adsorber following the scrubber for additional control of GenX. Fugitive emissions from enclosed areas of the PPA process (i.e., room air) are also vented through the PPA carbon bed adsorber though it does not pass through the scrubber prior to the adsorber. Testing was conducted at the inlet to the carbon bed and at the stack to determine the overall reduction efficiency to GenX emissions due to the addition of the carbon bed adsorber.

The second series of test runs was conducted on the inlet and outlet of the carbon bed adsorber located at the Vinyl Ethers North (VEN) process area. As noted in previous reports, the Division Stack is a common stack through which emissions from VEN Waste Gas Scrubber (WGS) are combined with fugitive emissions collected from the enclosed areas of VEN (sometimes referred to as "room air"). Gases from various reaction vessels and unit operations in the hexafluoropropylene oxide (HFPO) and VEN processes are vented through the WGS, a caustic scrubber which reduces emissions of GenX (HFPO Dimer Acid) and its precursors (HFPO Dimer Acid Fluoride). The carbon bed adsorber was added to provide control of the room air emissions prior to being vented to the Division Stack. Testing was conducted at the inlet and outlet of the carbon bed adsorber to determine removal efficiency of the HFPO Dimer Acid from the room air. During the testing, the HFPO process was operating and the VEN process was producing perfluoro-sulfonylethoxy-propyl vinyl ether (PSEPVE).

Sampling Method

Testing was conducted using a modified EPA Method 0010 found in the SW-846 compendium of *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods*. This sampling train is a variation of the EPA Reference Method 5 found in 40 CFR 60, Appendix A. The Method 0010 train extracts a sample isokinetically from the gas stream, passes the sample through a temperature-controlled filter, through a temperature-controlled condenser and into a series of XAD-2 resin “traps” and impingers to capture and collect the materials that passed through the filter. The test method is designed to capture certain particulate and condensable materials for later recovery and analysis.

After sample recovery, the samples were sent to Chemours’ contractor, Test America’s laboratory in Denver, Colorado. GenX was extracted from the resin traps. The DAQ required split samples after extraction to be submitted to the DAQ for independent analysis. The split samples were sent to the EPA laboratory in Athens, Georgia. This summary of results only addresses the results provided by Test America for Chemours. Laboratory analysis and quantification was performed using a liquid chromatography column and a dual mass spectrometer (LC/MS/MS).

Test Results

The reported GenX test results reflect corrected emission rates accounting for dilution and spike recovery values.

PPA Area Test Results

GenX emissions testing of the PPA carbon bed inlet and the PPA Area Stack (for carbon bed outlet results) was conducted on June 12, 2018. Two runs were conducted to characterize the emissions reduction by the carbon bed during the hydrolysis step in the process. The hydrolysis step has been determined to produce the highest emission rate of GenX during the process cycle. The per run emission rate and average for two runs is displayed in the table below. Inlet and outlet volumetric flow rates were within the normal variation that we expect between independent measurements.

Table 1. PPA Carbon Bed Adsorber Test Results, June 12, 2018

	Inlet		Outlet		Removal Efficiency
	g/sec	lb/hr	g/sec	Lb/hr	%
Run 1	2.60 E-02	2.07 E-01	3.99 E-05	3.17 E-04	99.8
Run 2	4.33 E-02	3.44 E-01	1.09 E-04	8.67 E-04	99.7
Average	3.47 E-02	2.76 E-01	7.45 E-05	5.92 E-04	99.8

Division Stack/Vinyl Ethers North Carbon Bed Test Results

Testing was conducted at the carbon bed adsorber inlet and outlet on June 15, 2018. The carbon bed adsorber controls emissions from the VEN room air. During the testing, PSEPVE was being produced and all processes were operating normally. The test results and control efficiency are summarized in Table 2

below. Inlet and outlet volumetric flow rates were within the normal variation that we expect between independent measurements.

Table 2. VEN Room Air Carbon Bed Adsorber Test Results, June 15, 2018

	Inlet		Outlet		Removal Efficiency
	g/sec	lb/hr	g/sec	Lb/hr	%
Run 1	1.50 E-03	1.19 E-02	3.85 E-05	3.06 E-04	97.4
Run 2	2.55 E-03	2.02 E-02	1.39 E-05	1.10 E-04	99.5
Average	2.03 E-03	1.61 E-02	2.62 E-05	2.08 E-04	98.7

Summary and Conclusions

NC DAQ staff members were on site during each day that source testing occurred. DAQ staff observed the source test teams, the sample recovery and the process operations. DAQ required Chemours to develop test and analysis methodology within less than a four-month window. Based upon the onsite observation of the testing and review of the test report, NC DAQ concludes that the testing was conducted in accordance to the modified testing protocol submitted by Chemours and that the analytical results appear representative of the stack conditions and process operations during the testing. Both carbon bed adsorbers demonstrated control efficiency above 98.5 removal of the HFPO dimer acid.

Cc: Central Files – Bladen County
IBEAM Documents - 0900009

