

Fact Sheet



For Final Minor Modification Permitting Action Under 45CSR30 and Title V of the Clean Air Act

This Fact Sheet serves to address the changes specific to this Minor Modification, and shall be considered a supplement to the Fact Sheet corresponding with the Title V operating permit issued on December 1, 2010.

Permit Number: **R30-10700001-2010**
Application Received: **July 10, 2014**
Plant Identification Number: **03-54-10700001**
Permittee: **E. I. du Pont de Nemours and Company**
Facility Name: **Washington Works**
Business Unit: **Fluoropolymers (Part 2 of 14)**
Mailing Address: **P.O. Box 1217, Washington, WV 26181-1217**

Permit Action Number: MM07 Revised: December 23, 2014

Physical Location:	Washington, Wood County, West Virginia
UTM Coordinates:	442.3767 km Easting • 4,346.8331 km Northing • Zone 17
Directions:	Route 68 west from Parkersburg to intersection of Route 892. Continue west on Route 892 with the plant being on the north side about one mile from the intersection of Routes 68 and 892.

Facility Description

Within the Fluoropolymers Business Unit, there are the following Fluoroproduct production areas: C1P, C2, C3, T1-T4 and T7, T5, and T6. Each area produces a product or family of products by varying operating conditions and small adjustments to raw material ratios or material feed rates. The following is a general description of the operations in each of the Fluoroproduct production areas within the Fluoropolymers Business Unit.

C1P Area

Within the "C1P" area of DuPont Washington Works is a process capable of producing a variety of products in dispersion, flake and cube form. These products are made from fluoromonomers produced at the Washington Works Facility along with monomers from outside sources. The main product from this process is TEFLON® PFA.

C2 Area

The C2 Area manufactures fluoropolymer resins by precharging fluoromonomers into reactors along with demineralized water. Aqueous solutions of catalyst salts are then pumped into the reactors to initiate polymerization. Additional fluoromonomers are fed into the reactors as the reaction proceeds. Unreacted fluoromonomers are vented to recycling facilities at the end of the reaction. The remaining fluoropolymer and water slurry is pumped to agglomerators that mechanically separate the fluoropolymer from the water. Alternatively, the reactor output may be sent to facilities which concentrate the dispersion to higher solids and package the dispersion for sale. From the agglomerators, the polymer is conveyed to devices where water and other low boiling compounds are removed prior to extrusion. The polymer is then converted to pellets via an extrusion process. The pellets are hot air sparged to remove additional traces of miscellaneous volatile fluorocarbons, elutriated to remove traces of polymer fines and packaged for distribution.

C3 Area

The C3 area manufactures various molecular weight Telomers, which are short, straight chain carbon-fluorine compounds. Telomer products are most commonly made up of the short chain compounds with four to fourteen carbons. There are several recipes, one of which is selected to make a desired product. All recipes perform similarly in that:

- Lower molecular weight (MW) Telomers are added to a reactor.
- Monomer and other raw materials are added and reacted to form more lower MW Telomers and to convert lower MW Telomers to higher MW Telomers.
- At the end of reaction, the reaction mass is transferred to distillation which is used to separate the different MW Telomers. Lower MW Telomers are put into hold tanks for re-use in the reactor. Higher MW Telomers remain in the distillation pot and become Telomer product.
- The Telomer product is filtered and transferred to product storage tanks.
- The finished Telomer product is loaded into tank trailers for shipment.

T1-T4, and T7 Areas

The T1-T4, and T7 areas produce final products fluoromonomers tetrafluoroethylene (TFE) and hexafluoropropylene (HFP); an intermediate, perfluorocyclobutane; and byproducts hydrogen chloride (HCl, aqueous) and calcium fluoride (CaF₂, solid). The production facility is divided into the following sections: T1-TFE Synthesis, T2-TFE Refining, T3-HFP Synthesis, T4-HFP Refining, and T7-Utilities.

Fluorocarbons are reacted by pyrolysis in the T1 area and the products are separated to form crude TFE and recovered byproducts. TFE is refined in the T2 area. In-process materials and intermediates are reacted by pyrolysis in the T3 area to form crude HFP that is then refined in the T4 area. The T7 area is comprised of several utilities, including: refrigeration and cold brine supply; the unit vacuum systems for maintenance clearing of equipment; waste acid neutralization; and the thermal converter. The thermal converter combusts fluorine-containing byproduct gases from the T1-T4 process areas and from polymerization operations in the C1P, C2, C3, and T6 areas; and from two different non-hazardous fluorine-containing liquid streams to produce aqueous hydrogen fluoride (HF) which is reacted with slaked lime (calcium oxide or CaO) to form CaF₂.

T5 Area

The T5 area produces fluoropolymer resin. The basic processes used are polymerization, drying, and modification. The resin is produced by water based emulsion polymerization in one of two reactor units. Water, monomer (primarily tetrafluoroethylene), process aids, and other minor ingredients are introduced to the reactor. The reaction starts under elevated pressure, but proceeds to an endpoint at sub-ambient pressure. The resin is removed as slurry and is stored in one of several tanks pending further treatment and drying. The polymer slurry is processed and dried. The wet polymer passes through one of two dryers. Emissions from either dryer pass through cyclone

separators to recover particulate matter. Both cyclone systems employ a water spray to improve effectiveness. The material recovered from the cyclones is returned to the process. Dried resin is transferred to a pack-out room where it is drummed using automated equipment. Air from the pack-out room is exhausted through a scrubber. The recovered material from the packout exhaust is not recycled to the process.

T6 Area

The Teflon® T6 area produces TFE based homopolymers in four agitated batch reactors. The reaction takes place in an aqueous medium, and a milk white raw polymer dispersion in water is produced. A portion of the raw dispersion production is dried and sold as powder, and a portion is processed and sold as a finished aqueous dispersion.

Copolymer dispersion products are also made. A batch is started by adding water and other ingredients to the reactor. Polymerization takes place in the aqueous phase at high temperature and pressure. At the end of each batch, most of the unreacted material is recycled for reuse or sent to the thermal converter. Some products are made by partially concentrating the reactor output in a water/solids separation vessel where some of the water is removed. For product sold as fine powder, the material is dried at high temperature with subsequent removal of impurities. The dried product is cooled and packaged.

The minor modification incorporates the changes to R13-2391H in the C3 Area.

Emissions Summary

As a result of this modification, the facility will have the following change in emissions:

Overall

Equipment ID	Equipment Name	Regulated Pollutant	Proposed Emissions (tpy)	Existing Permit Limit [C3HPE] (tpy)	Emissions Increase (tpy)
C3ID	Tank	VOC	+ 0.5	0	+ 0.5
C3IE	Tank	VOC			
C3HX	Tank	VOC			
C3IX	Tank	VOC	+ 0.25	0	+ 0.25
C3IY	Tank	VOC			
Total					+ 0.75

Title V Program Applicability Basis

With the proposed changes associated with this modification, this facility maintains the potential to emit over 100 tons per year of criteria pollutants, over 10 tons per year of an individual HAP, and over 25 tons per year aggregate HAPs. Therefore, DuPont Washington Works is required to have an operating permit pursuant to Title V of the Federal Clean Air Act as amended and 45CSR30.

Legal and Factual Basis for Permit Conditions

The State and Federally-enforceable conditions of the Title V Operating Permits are based upon the requirements of the State of West Virginia Operating Permit Rule 45CSR30 for the purposes of Title V of the Federal Clean Air Act and the underlying applicable requirements in other state and federal rules.

The modification to this facility has been found to be subject to the following applicable rules:

Federal and State:	45CSR13	Permits for construction, modification, relocation, etc.
	45CSR30	Operating permit requirement.
State Only:	N/A	

Each State and Federally-enforceable condition of the Title V Operating Permit references the specific relevant requirements of 45CSR30 or the applicable requirement upon which it is based. Any condition of the Title V permit that is enforceable by the State but is not Federally-enforceable is identified in the Title V permit as such.

The Secretary's authority to require standards under 40 C.F.R. Part 60 (NSPS), 40 C.F.R. Part 61 (NESHAPs), and 40 C.F.R. Part 63 (NESHAPs MACT) is provided in West Virginia Code §§ 22-5-1 *et seq.*, 45CSR16, 45CSR34 and 45CSR30.

The following Permits are the only permits related to this modification:

Active Permits/Consent Orders

The following are the only permits associated with this modification:

Permit or Consent Order Number	Date of Issuance	Permit Determinations or Amendments That Affect the Permit (<i>if any</i>)
R13-2391H	10/21/2014	

Conditions from this facility's Rule 13 permit(s) governing construction-related specifications and timing requirements will not be included in the Title V Operating Permit but will remain independently enforceable under the applicable Rule 13 permit(s). All other conditions from this facility's Rule 13 permit(s) governing the source's operation and compliance have been incorporated into this Title V permit in accordance with the "General Requirement Comparison Table B," which may be downloaded from DAQ's website.

Determinations and Justifications

Changes made to the Title V Permit as part of this minor modification are summarized below:

1. Updated Section 1.2 and Appendix C to reflect the most current R13 Permit.
2. Two sets of tanks (C3ID, C3IE, and C3HX) and (C3IX and C3IY) will purge vessel head space to emission point C3HPE to eliminate oxygen from the system. It is currently estimated that the Permittee may have to address this fouling a maximum of 10 times per year for each set of tanks involved. This will increase VOC emissions from 2.65 tpy to 3.40 tpy. Condition 6.1.3 has been updated to reflect this change.
3. Tanks C3ID, C3IE, C3HX, C3IX, and C3IY have been added to Attachment A of Appendix C to monitor the number of tank cleanings.

Non-Applicability Determinations

None

Request for Variances or Alternatives

None

Insignificant Activities

Insignificant emission unit(s) and activities are identified in the Title V application.

Comment Period

Beginning Date: N/A
Ending Date: N/A

All written comments should be addressed to the following individual and office:

Mike Egnor
Title V Permit Writer
West Virginia Department of Environmental Protection
Division of Air Quality
601 57th Street SE
Charleston, WV 25304
michael.egnor@wv.gov

Procedure for Requesting Public Hearing

During the public comment period, any interested person may submit written comments on the draft permit and may request a public hearing, if no public hearing has already been scheduled. A request for public hearing shall be in writing and shall state the nature of the issues proposed to be raised in the hearing. The Secretary shall grant such a request for a hearing if he/she concludes that a public hearing is appropriate. Any public hearing shall be held in the general area in which the facility is located.

Point of Contact

Mike Egnor
West Virginia Department of Environmental Protection
Division of Air Quality
601 57th Street SE
Charleston, WV 25304
Phone: 304/926-0499 ext. 1208 • Fax: 304/926-0478

Response to Comments (Statement of Basis)

Not applicable.