

# 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**

Applications Received: **MM01: April 30, 2012**

**MM02: August 22, 2012**

**MM03: November 1, 2012**

**MM04: November 13, 2012**

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: MM01, MM02, MM03, and MM04 Revised: June 11, 2013

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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.

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### 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 (CaF<sub>2</sub>, 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 CaF<sub>2</sub>.

### **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<sup>®</sup> 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 following minor modifications incorporate the changes to the following NSR Permit Revisions:

MM01 – R13-1953H

MM02 – R13-0815G

MM03 – R13-2365E

MM04 – R13-1353E

### **Emissions Summary**

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

R13-1953H

Regulated Pollutant	Emissions Change	
	lb/hr	tpy
PM <sub>10</sub>	-1.50	-0.49
VOC	2.11	1.75
Hydrogen Fluoride (HF)	-0.53	-1.10

R13-0815G

Regulated Pollutant	Emissions Change	
	lb/hr	tpy
PM <sub>10</sub>	400	0.20
VOC	-3,280	-1.64
ODC	2,620	1.35
Acetonitrile	-36	-0.018
Toluene	-6	-0.003

R13-2365E

Regulated Pollutant	Emissions Change	
	lb/hr	tpy
PM	-0.01	-0.05
PM <sub>10</sub>	-0.01	-0.03
HF	-0.29	-1.26
VOC	0.31	1.35

R13-1353E

Regulated Pollutant	Emissions Change	
	lb/hr	tpy
ODC	1.4	0.28
VOC	-42.9	7.33
Hydrogen Fluoride (HF)	-0.02	-0.044

Overall

Regulated Pollutant	Emissions Change	
	lb/hr	tpy
PM	-0.01	-0.05
PM <sub>10</sub>	398.5	-0.32
VOC	- 3,320	-5.87
ODC	2,621	1.63
Hydrogen Fluoride (HF)	-0.84	-2.40
Acetonitrile	-36	-0.018
Toluene	-6	-0.003

**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.

### Active Permits/Consent Orders

Permit or Consent Order Number	Date of Issuance	Permit Determinations or Amendments That Affect the Permit (if any)
R13-1953H	8/31/2012	
R13-0815G	10/11/2012	
R13-2365E	4/4/2013	
R13-1353E	2/21/2013	

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:

Changes to C2 Area resulting from:

1. R13-1953H Changes
  - A) Section 1.0 - removal of the following equipment that is on the Insignificant List: C2DJ, C2EE, C2KY, C2KZ; and addition of C2DH.
  - B)
    1. Removed equipment that is no longer in service.
    2. Updated significant figures to DAQ rounding policy.
    3. Updated emissions in Conditions 5.1.1 through 5.1.3 due to inclusion of a new Dimer Acid/Salt compound that will be used in the C2 process area as a phased in replacement for APFO. The change will result in:
      - a. New or increased VOC emissions related to the new compound and its degradation product E1.
      - b. Addition of acetonitrile emissions as an impurity in the new compound from emission points C2DTE and C2EFE. These emissions are included in the revised VOC emissions in Condition 5.1.2.
      - c. Increase in emissions from C2EQ to reflect additional screen pack changes.
      - d. Revised emission calculations to reflect operating scenarios using 100% APFO or 100% new compound. Since the use of both compounds will occur over a multi-year phase in period, permit limits were established to cover both scenarios.
      - e. Addition of VOC emissions from emission point C2DTE due to E1.
    4. C2DJ will no longer be a backup process tank for C2DK and will be receiving decant waters from C2EG. Since no regulated pollutants will be emitted from C2DJ in this service, control device C2DJC and emission point C2DJE were removed.
    5. Updated Condition 5.1.4 to "total HAPs" for all emission points and identified them in the footnote.
  - C) Condition 5.1.7 - Added "the current revision of" prior to "permit R13-1823".
  - D) Conditions 5.1.8, 5.1.9, 5.2.1, 5.2.2, 5.2.3, and 5.2.4 - removed references to equipment that is no longer in service

- E) Section 5.2.1 - corrected reference from 5.1.1 to 5.1.8.
- F) Appendix B, Attachment A - (1) changed parameter language from "C2EJE" to "System #1" and "C2EFE" to "System #2"; (2) Deleted parameters for C2DI and C2EB that were removed from service; (3) Added monitoring as indicated below.

Additions to Monthly Record Keeping, Attachment A

Equipment ID	Monthly Monitoring Parameter
Facility	# of completed GenX batches
C2DA	# of completed dispersion batches
C2DA	# of GenX dispersion batches
C2DW	Max pph held for one hour during the month
C2EH	Max pph held for one hour during the month
C2DT, C2DW, C2EH	Max pph rate of all TDD for one hour during the month

- G) Appendix B, Attachment B - deleted emission points C2DBE, C2DJE, C2DME, C2EBE1, C2EBE2, C2KAE, C2KIE, and C2KNE that have been removed from service.
- H) Appendix B, Attachment C - (1) deleted emission points C2DBE, C2DJE, C2DME, C2EBE1/C2EBE2, C2KAE, C2KIE from VOC Emissions and added C2DTE; (2) deleted emission points C2DBE, C2DJE, C2DME, C2EBE1/C2EBE2, and C2KIE from PM10 emissions; (3) deleted C2DBE, C2DME, C2EBE1/C2EBE2, C2KAE, C2KIE, and C2KNE from HF emissions; (4) and combined Toluene & Total HAP emissions section into "total HAPs".
- I) Appendix B, Attachment D - deleted scrubber C2DBC.

Changes to T6 Area resulting from:

2. R13-0815G Changes

Changes to the Emissions Unit Table in Section 1.0 and Condition 9.1.5 have been made because of the following:

- A) Inclusion of the new compound (Dimer Acid/Salt (CAS # 13252-13-6 and CAS # 62037-80-3)) that will be used in the T6 process area as a phased in replacement for APFO. The compound may also be referred to as FRD903, FRD902 or FRD905.
- B) Revised calculations to reflect changes in emissions related to the new compound and its degradation product E1 (also a VOC).
- C) Revised calculations for acetonitrile emissions as an impurity in the new compound in addition to reducing the impurity value in another raw material.
- D) Increase in ODC emissions from various units as a result of new assumptions.
- E) Revised emission calculations to reflect operating scenarios using 100% APFO or 100% new compound. The use of both compounds will occur over a multi-year phase in period. Therefore permit limits need to be established to cover both scenarios.
- F) Addition of VOC emissions from emission points T6IZCE, T6IEE, T6IFE, and T6IVE due to E1.
- G) Changing service of T6PG and T6PH to remove potential production of certain product types no longer planned.
- H) Removed permitted emergency vents from the Emission Units Table and emission limits in Condition 9.1.5 for T6IBE2, T6ICE2, T6IDE2, and T6IUE2.

Changes to CIP Area resulting from:

3. R13-2365E Changes

- A) Inclusion of the new compound (Dimer Acid/Salt (CAS# 13252-13-6 and CAS #62037-80-3)) that will be used in the C1-P process area as a phased in replacement for APFO. The compound may also be referred to as FRD903, FRD902 or FRD905.
- B) Revised calculations to reflect changes in emissions related to the new compound and its degradation product E1 (CAS #3330-15-2 also a VOC). The affected emission limits are given in Condition 4.1.1.

- C) Removed CIGYE and CIGY from the Emission Units Table in Section 1.0 and Conditions 4.1.1 and 4.1.2 because these emission units were removed from service.
- D) Removed emission point CICHE and its associated scrubber C1CHC from the Permit because the emission units were removed from service; and added emission point CINPE and its associated scrubber C1NPC.
- E) Eliminated parametric monitoring requirements for C1FSC1 from Condition 4.2.2. Source C1FSC1 is a baghouse used to separate entrained product from the air stream. Any material that would exit this device due to a failure would enter the downstream recovery/control device C1FSC2 which has process interlock settings based on high pressure (Table 4.2.2.a). The monitoring for C1FSC1 is not needed to insure proper emission control from downstream equipment discharging through C1FSE. Further parametric monitoring has been added to this Condition for C1FSC2 and C1FSC3.
- F) Condition 4.3.1 has been revised to eliminate the initial compliance test and add a requirement to test within 90 days of the date the production rate exceeds 120% of the rate demonstrated from the previous compliance test.
- G) Removed CIGYE from the Rule 21 list given in Appendix E.
- H) Appendix A, Attachment A - removed CIGY and CICH from monthly records; added parameters for CIFQ, CIGK, and CIFV; and (3) corrected the equipment descriptions for CIFS and CIFV.
- I) Appendix A, Attachments B & C - (1) removed CIGYE, area emissions from CIGY, and CICHE from Attachments B & C; (2) removed CIGY from the monthly and annual emissions for emission points C1FQE, C1FWE, and C1GXE; and (3) added CINPE in Attachment B and Attachment C for VOC emissions.

Changes to T5 Area resulting from:

- 4. R13-1353E Changes
  - A) Removal of Ovens T5HQ and T5HR from Condition 8.1.1.
  - B) Revision of emission limits in Condition 8.1.1. This is due to the following:
    - 1. Inclusion of the new compound (Dimer Acid/Salt (CAS # 13252-13-6 and CAS # 62037-80-3)) that will be used in the T5 process area as a phased in replacement for APFO. The compound may also be referred to as FRD 903/902 or FRD905.
    - 2. Revised calculations to reflect changes in:
      - a. emissions related to the new compound and its degradation product E1 (also a VOC);
      - b. changes in aborted batch numbers;
      - c. flexibility to manufacture products with different recipes in T5HC and T5HD;
      - d. revised approach to calculations for T5HC and T5HD; and
      - e. acetonitrile emissions as an impurity in the new compound in addition to reducing the impurity value in another raw material. These emissions are included in the revised VOC emissions of Condition 8.1.1.
    - 3. Revised emission calculations reflecting operating scenarios using 100% APFO or 100% new compound. The use of both compounds will occur over a multi-year phase in period. Therefore permit limits need to be established to cover both scenarios.
    - 4. Addition of VOC emissions from emission point T5HIE due to E1.
  - C) Revised operation for venting residual gases after reactions in T5HC and T5HD to vents T5HCE and T5HDE instead of "Area" emission point. Because this mode of operation has not yet been tested and proven the current T5HC/T5HD Area VOC limit was retained in Condition 8.1.1 to allow for either operating scenario.

### Non-Applicability Determinations

- 1. Greenhouse Gas Tailoring Rule  
This modification did not trigger a PSD permit. As such, there are no applicable GHG permitting requirements.

### 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 57<sup>th</sup> Street SE  
Charleston, WV 25304

### **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 57<sup>th</sup> Street SE  
Charleston, WV 25304  
Phone: 304/926-0499 ext. 1208 • Fax: 304/926-0478

### **Response to Comments (Statement of Basis)**

Not applicable.