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 <p>WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION  <b>DIVISION OF AIR QUALITY</b>          601 57<sup>th</sup> Street, SE          Charleston, WV 25304          (304) 926-0475  <a href="http://www.dep.wv.gov/daq">www.dep.wv.gov/daq</a></p>	<b>APPLICATION FOR NSR PERMIT</b> <b>AND</b> <b>TITLE V PERMIT REVISION</b> <b>(OPTIONAL)</b>
PLEASE CHECK ALL THAT APPLY TO <b>NSR (45CSR13)</b> (IF KNOWN): <input type="checkbox"/> CONSTRUCTION <input type="checkbox"/> MODIFICATION <input type="checkbox"/> RELOCATION <input type="checkbox"/> CLASS I ADMINISTRATIVE UPDATE <input type="checkbox"/> TEMPORARY <input checked="" type="checkbox"/> CLASS II ADMINISTRATIVE UPDATE <input checked="" type="checkbox"/> AFTER-THE-FACT	PLEASE CHECK TYPE OF <b>45CSR30 (TITLE V)</b> REVISION (IF ANY): <input type="checkbox"/> ADMINISTRATIVE AMENDMENT <input checked="" type="checkbox"/> MINOR MODIFICATION <input type="checkbox"/> SIGNIFICANT MODIFICATION IF ANY BOX ABOVE IS CHECKED, INCLUDE TITLE V REVISION INFORMATION AS <b>ATTACHMENT S</b> TO THIS APPLICATION
<b>FOR TITLE V FACILITIES ONLY: Please refer to "Title V Revision Guidance" in order to determine your Title V Revision options (Appendix A, "Title V Permit Revision Flowchart") and ability to operate with the changes requested in this Permit Application.</b>	
<b>Section I. General</b>	
1. Name of applicant (as registered with the WV Secretary of State's Office): The Chemours Company FC, LLC	2. Federal Employer ID No. (FEIN): 46-5626518
3. Name of facility (if different from above): Washington Works Facility	4. The applicant is the: <input type="checkbox"/> OWNER <input type="checkbox"/> OPERATOR <input checked="" type="checkbox"/> BOTH
5A. Applicant's mailing address: Building 1, Washington Works Washington WV, 26181-1217	5B. Facility's present physical address: 8480 DuPont Road Washington, WV 26181
6. <b>West Virginia Business Registration.</b> Is the applicant a resident of the State of West Virginia? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO – If <b>YES</b> , provide a copy of the <b>Certificate of Incorporation/Organization/Limited Partnership</b> (one page) including any name change amendments or other Business Registration Certificate as <b>Attachment A</b> . – If <b>NO</b> , provide a copy of the <b>Certificate of Authority/Authority of L.L.C./Registration</b> (one page) including any name change amendments or other Business Certificate as <b>Attachment A</b> .	
7. If applicant is a subsidiary corporation, please provide the name of parent corporation:	
8. Does the applicant own, lease, have an option to buy or otherwise have control of the <i>proposed site</i> ? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO – If <b>YES</b> , please explain:       Owns site – If <b>NO</b> , you are not eligible for a permit for this source.	
9. Type of plant or facility (stationary source) to be <b>constructed, modified, relocated, administratively updated</b> or <b>temporarily permitted</b> (e.g., coal preparation plant, primary crusher, etc.): Chemical Manufacturing	10. North American Industry Classification System (NAICS) code for the facility: 325199
11A. DAQ Plant ID No. (for existing facilities only): 107-00182	11B. List all current 45CSR13 and 45CSR30 (Title V) permit numbers associated with this process (for existing facilities only): R13-2365E, R13-3223, R30-107-00001 Segment 2 of 14
<b>All of the required forms and additional information can be found under the Permitting Section of DAQ's website, or requested by phone.</b>	

12A. – For <b>Modifications, Administrative Updates or Temporary permits</b> at an existing facility, please provide directions to the <i>present location</i> of the facility from the nearest state road; – For <b>Construction or Relocation permits</b> , please provide directions to the <i>proposed new site location</i> from the nearest state road. Include a <b>MAP</b> as <b>Attachment B</b> .  Take the Route 50 bypass towards Ohio from I-77. Exit the Route 50 bypass at the last exit in West Virginia. At the light turn left and continue on DuPont road for approximately ½ - ¾ mile. The main plant entrance will be visible on your right.		
12.B. New site address (if applicable): N/A	12C. Nearest city or town: Parkersburg	12D. County: Wood
12.E. UTM Northing (KM): 4346.8331	12F. UTM Easting (KM): 442.3767	12G. UTM Zone: 17
13. Briefly describe the proposed change(s) at the facility: This permit amendment is for including an existing oven (C2EQ under R13-1953H) within area C1, whereas in the past, both areas C1 and C2 operated the oven; no physical moves or changes will occur. Also, increasing emissions of VOCs by <6 lbs/hr or 10 tpy from C1FWE and C1FQE after a recent detailed review of air emission calculations.		
14A. Provide the date of anticipated installation or change: 05/01/2015 – If this is an <b>After-The-Fact</b> permit application, provide the date upon which the proposed change did happen: 2007		14B. Date of anticipated Start-Up if a permit is granted:
14C. Provide a <b>Schedule</b> of the planned <b>Installation of/Change</b> to and <b>Start-Up</b> of each of the units proposed in this permit application as <b>Attachment C</b> (if more than one unit is involved).		
15. Provide maximum projected <b>Operating Schedule</b> of activity/activities outlined in this application: Hours Per Day 24      Days Per Week 7      Weeks Per Year 52		
16. Is demolition or physical renovation at an existing facility involved? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		
17. <b>Risk Management Plans.</b> If this facility is subject to 112(r) of the 1990 CAAA, or will become subject due to proposed changes (for applicability help see <a href="http://www.epa.gov/ceppo">www.epa.gov/ceppo</a> ), submit your <b>Risk Management Plan (RMP)</b> to U. S. EPA Region III.		
18. <b>Regulatory Discussion.</b> List all Federal and State air pollution control regulations that you believe are applicable to the proposed process ( <i>if known</i> ). A list of possible applicable requirements is also included in Attachment S of this application (Title V Permit Revision Information). Discuss applicability and proposed demonstration(s) of compliance ( <i>if known</i> ). Provide this information as <b>Attachment D</b> .		
<b>Section II. Additional attachments and supporting documents.</b>		
19. Include a check payable to WVDEP – Division of Air Quality with the appropriate <b>application fee</b> (per 45CSR22 and 45CSR13).		
20. Include a <b>Table of Contents</b> as the first page of your application package.		
21. Provide a <b>Plot Plan</b> , e.g. scaled map(s) and/or sketch(es) showing the location of the property on which the stationary source(s) is or is to be located as <b>Attachment E</b> (Refer to <b>Plot Plan Guidance</b> ) . – Indicate the location of the nearest occupied structure (e.g. church, school, business, residence).		
22. Provide a <b>Detailed Process Flow Diagram(s)</b> showing each proposed or modified emissions unit, emission point and control device as <b>Attachment F</b> .		
23. Provide a <b>Process Description</b> as <b>Attachment G</b> . – Also describe and quantify to the extent possible all changes made to the facility since the last permit review (if applicable).		
<b>All of the required forms and additional information can be found under the Permitting Section of DAQ's website, or requested by phone.</b>		
24. Provide <b>Material Safety Data Sheets (MSDS)</b> for all materials processed, used or produced as <b>Attachment H</b> . – For chemical processes, provide a MSDS for each compound emitted to the air.		

25. Fill out the <b>Emission Units Table</b> and provide it as <b>Attachment I</b> .															
26. Fill out the <b>Emission Points Data Summary Sheet (Table 1 and Table 2)</b> and provide it as <b>Attachment J</b> .															
27. Fill out the <b>Fugitive Emissions Data Summary Sheet</b> and provide it as <b>Attachment K</b> .															
<p>28. Check all applicable <b>Emissions Unit Data Sheets</b> listed below:</p> <table border="0"> <tr> <td><input type="checkbox"/> Bulk Liquid Transfer Operations</td> <td><input type="checkbox"/> Haul Road Emissions</td> <td><input type="checkbox"/> Quarry</td> </tr> <tr> <td><input checked="" type="checkbox"/> Chemical Processes</td> <td><input type="checkbox"/> Hot Mix Asphalt Plant</td> <td><input type="checkbox"/> Solid Materials Sizing, Handling and Storage Facilities</td> </tr> <tr> <td><input type="checkbox"/> Concrete Batch Plant</td> <td><input type="checkbox"/> Incinerator</td> <td><input type="checkbox"/> Storage Tanks</td> </tr> <tr> <td><input type="checkbox"/> Grey Iron and Steel Foundry</td> <td><input type="checkbox"/> Indirect Heat Exchanger</td> <td></td> </tr> <tr> <td><input type="checkbox"/> General Emission Unit, specify</td> <td></td> <td></td> </tr> </table> <p>Fill out and provide the <b>Emissions Unit Data Sheet(s)</b> as <b>Attachment L</b>.</p>	<input type="checkbox"/> Bulk Liquid Transfer Operations	<input type="checkbox"/> Haul Road Emissions	<input type="checkbox"/> Quarry	<input checked="" type="checkbox"/> Chemical Processes	<input type="checkbox"/> Hot Mix Asphalt Plant	<input type="checkbox"/> Solid Materials Sizing, Handling and Storage Facilities	<input type="checkbox"/> Concrete Batch Plant	<input type="checkbox"/> Incinerator	<input type="checkbox"/> Storage Tanks	<input type="checkbox"/> Grey Iron and Steel Foundry	<input type="checkbox"/> Indirect Heat Exchanger		<input type="checkbox"/> General Emission Unit, specify		
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<input type="checkbox"/> General Emission Unit, specify															
<p>29. Check all applicable <b>Air Pollution Control Device Sheets</b> listed below:</p> <table border="0"> <tr> <td><input type="checkbox"/> Absorption Systems</td> <td><input type="checkbox"/> Baghouse</td> <td><input type="checkbox"/> Flare</td> </tr> <tr> <td><input type="checkbox"/> Adsorption Systems</td> <td><input type="checkbox"/> Condenser</td> <td><input type="checkbox"/> Mechanical Collector</td> </tr> <tr> <td><input type="checkbox"/> Afterburner</td> <td><input type="checkbox"/> Electrostatic Precipitator</td> <td><input checked="" type="checkbox"/> Wet Collecting System</td> </tr> <tr> <td colspan="3"><input type="checkbox"/> Other Collectors, specify</td> </tr> </table> <p>Fill out and provide the <b>Air Pollution Control Device Sheet(s)</b> as <b>Attachment M</b>.</p>	<input type="checkbox"/> Absorption Systems	<input type="checkbox"/> Baghouse	<input type="checkbox"/> Flare	<input type="checkbox"/> Adsorption Systems	<input type="checkbox"/> Condenser	<input type="checkbox"/> Mechanical Collector	<input type="checkbox"/> Afterburner	<input type="checkbox"/> Electrostatic Precipitator	<input checked="" type="checkbox"/> Wet Collecting System	<input type="checkbox"/> Other Collectors, specify					
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<input type="checkbox"/> Other Collectors, specify															
30. Provide all <b>Supporting Emissions Calculations</b> as <b>Attachment N</b> , or attach the calculations directly to the forms listed in Items 28 through 31.															
<p>31. <b>Monitoring, Recordkeeping, Reporting and Testing Plans.</b> Attach proposed monitoring, recordkeeping, reporting and testing plans in order to demonstrate compliance with the proposed emissions limits and operating parameters in this permit application. Provide this information as <b>Attachment O</b>.</p> <p>➤ Please be aware that all permits must be practically enforceable whether or not the applicant chooses to propose such measures. Additionally, the DAQ may not be able to accept all measures proposed by the applicant. If none of these plans are proposed by the applicant, DAQ will develop such plans and include them in the permit.</p>															
<p>32. <b>Public Notice.</b> At the time that the application is submitted, place a <b>Class I Legal Advertisement</b> in a newspaper of general circulation in the area where the source is or will be located (See 45CSR§13-8.3 through 45CSR§13-8.5 and <b>Example Legal Advertisement</b> for details). Please submit the <b>Affidavit of Publication</b> as <b>Attachment P</b> immediately upon receipt.</p>															
<p>33. <b>Business Confidentiality Claims.</b> Does this application include confidential information (per 45CSR31)?</p> <p style="text-align: center;"><input checked="" type="checkbox"/> YES      <input type="checkbox"/> NO</p> <p>➤ If <b>YES</b>, identify each segment of information on each page that is submitted as confidential and provide justification for each segment claimed confidential, including the criteria under 45CSR§31-4.1, and in accordance with the DAQ's <b>"Precautionary Notice – Claims of Confidentiality"</b> guidance found in the <b>General Instructions</b> as <b>Attachment Q</b>.</p>															

### Section III. Certification of Information

<p>34. <b>Authority/Delegation of Authority.</b> Only required when someone other than the responsible official signs the application. Check applicable <b>Authority Form</b> below:</p> <table border="0"> <tr> <td><input type="checkbox"/> Authority of Corporation or Other Business Entity</td> <td><input type="checkbox"/> Authority of Partnership</td> </tr> <tr> <td><input type="checkbox"/> Authority of Governmental Agency</td> <td><input type="checkbox"/> Authority of Limited Partnership</td> </tr> </table> <p>Submit completed and signed <b>Authority Form</b> as <b>Attachment R</b>.</p> <p><i>All of the required forms and additional information can be found under the Permitting Section of DAQ's website, or requested by phone.</i></p>	<input type="checkbox"/> Authority of Corporation or Other Business Entity	<input type="checkbox"/> Authority of Partnership	<input type="checkbox"/> Authority of Governmental Agency	<input type="checkbox"/> Authority of Limited Partnership
<input type="checkbox"/> Authority of Corporation or Other Business Entity	<input type="checkbox"/> Authority of Partnership			
<input type="checkbox"/> Authority of Governmental Agency	<input type="checkbox"/> Authority of Limited Partnership			

**35A. Certification of Information.** To certify this permit application, a Responsible Official (per 45CSR§13-2.22 and 45CSR§30-2.28) or Authorized Representative shall check the appropriate box and sign below.

**Certification of Truth, Accuracy, and Completeness**

I, the undersigned ☒ **Responsible Official** / ☐ **Authorized Representative**, hereby certify that all information contained in this application and any supporting documents appended hereto, is true, accurate, and complete based on information and belief after reasonable inquiry I further agree to assume responsibility for the construction, modification and/or relocation and operation of the stationary source described herein in accordance with this application and any amendments thereto, as well as the Department of Environmental Protection, Division of Air Quality permit issued in accordance with this application, along with all applicable rules and regulations of the West Virginia Division of Air Quality and W.Va. Code § 22-5-1 et seq. (State Air Pollution Control Act). If the business or agency changes its Responsible Official or Authorized Representative, the Director of the Division of Air Quality will be notified in writing within 30 days of the official change.

**Compliance Certification**

Except for requirements identified in the Title V Application for which compliance is not achieved, I, the undersigned hereby certify that, based on information and belief formed after reasonable inquiry, all air contaminant sources identified in this application are in compliance with all applicable requirements.

SIGNATURE

  
(Please use blue ink)

DATE:

May 7, 2015  
(Please use blue ink)

35B. Printed name of signee: Robert J. Fehrenbacher

35C. Title: Plant Manager

35D. E-mail:  
robert.j.fehrenbacher@chemours.com

36E. Phone: 304-863-4305

36F. FAX: 304-863-4962

36A. Printed name of contact person (if different from above): David F. Altman

36B. Title: Sr. Env. Control Consult.

36C. E-mail: david.f.altman@chemours.com

36D. Phone: 304-863-4271

36E. FAX: 304-863-4862

**PLEASE CHECK ALL APPLICABLE ATTACHMENTS INCLUDED WITH THIS PERMIT APPLICATION:**

- |  |  |
|--|--|
| <input checked="" type="checkbox"/> Attachment A: Business Certificate               | <input type="checkbox"/> Attachment K: Fugitive Emissions Data Summary Sheet                       |
| <input checked="" type="checkbox"/> Attachment B: Map(s)                             | <input checked="" type="checkbox"/> Attachment L: Emissions Unit Data Sheet(s)                     |
| <input type="checkbox"/> Attachment C: Installation and Start Up Schedule            | <input checked="" type="checkbox"/> Attachment M: Air Pollution Control Device Sheet(s)            |
| <input checked="" type="checkbox"/> Attachment D: Regulatory Discussion              | <input checked="" type="checkbox"/> Attachment N: Supporting Emissions Calculations                |
| <input checked="" type="checkbox"/> Attachment E: Plot Plan                          | <input checked="" type="checkbox"/> Attachment O: Monitoring/Recordkeeping/Reporting/Testing Plans |
| <input checked="" type="checkbox"/> Attachment F: Detailed Process Flow Diagram(s)   | <input checked="" type="checkbox"/> Attachment P: Public Notice                                    |
| <input checked="" type="checkbox"/> Attachment G: Process Description                | <input checked="" type="checkbox"/> Attachment Q: Business Confidential Claims                     |
| <input checked="" type="checkbox"/> Attachment H: Material Safety Data Sheets (MSDS) | <input type="checkbox"/> Attachment R: Authority Forms   |
| <input checked="" type="checkbox"/> Attachment I: Emission Units Table               | <input checked="" type="checkbox"/> Attachment S: Title V Permit Revision Information              |
| <input checked="" type="checkbox"/> Attachment J: Emission Points Data Summary Sheet | <input checked="" type="checkbox"/> Application Fee  |

*Please mail an original and three (3) copies of the complete permit application with the signature(s) to the DAQ, Permitting Section, at the address listed on the first page of this application. Please DO NOT fax permit applications.*

**FOR AGENCY USE ONLY – IF THIS IS A TITLE V SOURCE:**

- ☐ Forward 1 copy of the application to the Title V Permitting Group and:
- ☐ For Title V Administrative Amendments:
- ☐ NSR permit writer should notify Title V permit writer of draft permit,
- ☐ For Title V Minor Modifications:
- ☐ Title V permit writer should send appropriate notification to EPA and affected states within 5 days of receipt,
- ☐ NSR permit writer should notify Title V permit writer of draft permit.
- ☐ For Title V Significant Modifications processed in parallel with NSR Permit revision:
- ☐ NSR permit writer should notify a Title V permit writer of draft permit,
- ☐ Public notice should reference both 45CSR13 and Title V permits,
- ☐ EPA has 45 day review period of a draft permit.

*All of the required forms and additional information can be found under the Permitting Section of DAQ's website, or requested by phone.*

## Business Certificate

**WEST VIRGINIA  
STATE TAX DEPARTMENT  
BUSINESS REGISTRATION  
CERTIFICATE**

ISSUED TO:  
**THE CHEMOURS COMPANY FC, LLC  
8480 DUPONT RD  
WASHINGTON, WV 26181-8398**

**BUSINESS REGISTRATION ACCOUNT NUMBER: 2303-3963**

This certificate is issued on: **10/27/2014**

*This certificate is issued by  
the West Virginia State Tax Commissioner  
in accordance with Chapter 11, Article 12, of the West Virginia Code*

*The person or organization identified on this certificate is registered  
to conduct business in the State of West Virginia at the location above.*

This certificate is not transferrable and must be displayed at the location for which issued.  
This certificate shall be permanent until cessation of the business for which the certificate of registration was granted or until it is suspended, revoked or cancelled by the Tax Commissioner.

Change in name or change of location shall be considered a cessation of the business and a new certificate shall be required.

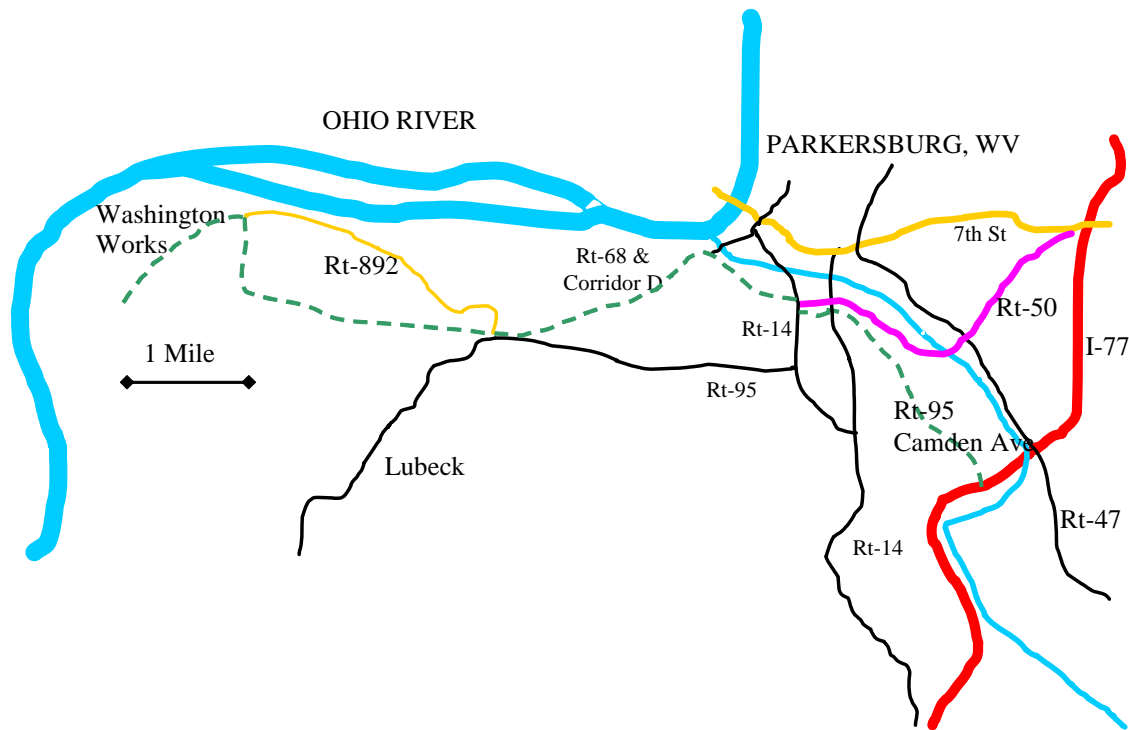
TRAVELING/STREET VENDORS: Must carry a copy of this certificate in every vehicle operated by them.  
CONTRACTORS, DRILLING OPERATORS, TIMBER/LOGGING OPERATIONS: Must have a copy of this certificate displayed at every job site within West Virginia.

## Attachment B

### Map to Facility



## ATTACHMENT B – Map to Facility



From Interstate 77, take exit for Rt-95/Camden Avenue.  
Proceed West until intersection with Rt-14 then turn right (north).  
After about 1/4 mile turn left onto Corridor D Bypass entrance.  
Follow the bypass to the exit just before the bridge  
Turn left (south) onto DuPont Rd, Rt-892.  
Proceed approx. 1 mile to facility on right.

## Regulatory Discussion

This process area is covered by the following state regulations:

1. 45CSR4
2. 45CSR7
3. 45CSR13
4. 45CSR21
5. 45CSR29
6. 45CSR30

This process area operation is currently covered by permit R13-2365E and R13-3223.

#### **45 CSR 7 – Compliance condition modification request – Condition A.6**

In the current permit the requirement for monitoring for particulate matter, found in permit condition A.6 which requires **“Monitoring shall be conducted at last once per month with a maximum of forty-five (45) days between consecutive readings”**. Chemours has experienced a significant issue with the interpretation of the condition such that we consistently perform the observations as required. The additional text that sets the 45 day maximum interval has been seen, despite educational efforts, to mean that there is up to a 45 day period after the last reading to take the next reading. Chemours is requesting that the compliance condition be simplified to require a monthly visual observation for visible particulate emissions. The elimination of the perceived conflicting 45 day period will enable Chemours personnel to ensure the readings are performed at the correct interval and that focus can be given to the Operations personnel to ensure the reading is always taken early in the operational month before production schedule or challenges alter the operational timing and cause a missed reading. The suggested limited text change from above is to **“Monitoring shall be conducted at least once per month.”**

#### **RACT**

45CSR21-40.3.c requires RACT analysis on a case by case basis for those VOC emissions greater than 6 pph which are constructed, modified, or begin operation after the date 45CSR 21 becomes effective. Permit R13-3223 requires RACT analysis for any increase in VOC from sources listed in R13-3223.

Based on a recent detailed review of source air pollutant emission calculations, a few sources will have increased VOC emissions, but below the 6 pph and 10 tpy VOC thresholds, therefore no RACT analysis is required.

The revised calculations result in an increase in permitted VOC emissions from emission point C1FWE from 26.54 pph to 32.2 pph, an increase of 5.66 pph; this will cause an increase in the annual VOC emissions from C1FWE: 0.29 tpy to 0.35 tpy. The same review necessitates an inclusion of acetonitrile emissions in the amounts of <0.01 pph and <0.01 tpy being emitted from the same emission point. These emissions were originally included in the permit and were inadvertently removed when source C1GY was removed. The emissions are from source C1FW – Ingredient feed system, with respect to cylinder change-outs.

Also associated with source C1GY were emissions from de-inventorying and re-inventorying the ingredient feed system (C1FW); these also were inadvertently removed. As a result, we seek to add back into the permit 600 lbs/year of VOC emissions from re-inventorying the feed system, and 915 lbs/year of VOC emissions from de-inventorying the feed system. Therefore, we seek to increase the current limit of VOC emission from C1FQE by 0.76 tons (21.00 tpy to 21.76 tpy).

Air pollutant emission calculations for C1GX (ingredient system charge pot) were also revised to account for emissions that occur while inventorying the charge pot, increasing total VOC emissions from emission point C1GXE from 0.29 to 0.31 tons/year.

Source C2EQ (an oven) from area C2 is being transferred to area C1, with no physical moves or changes, as source C1GZ. C1GZ vents to a scrubber with a vacuum pump (C1GZC), then to emission point C1GZE. The atmospheric emissions from the oven are 0.51 lbs/hr and 0.18 tons/year VOCs, hydrofluoric acid emissions are expected to be trace, as are PM emissions; CO emissions are estimated to be 0.01 lbs/hr and 0.01 tons/year

## PSD

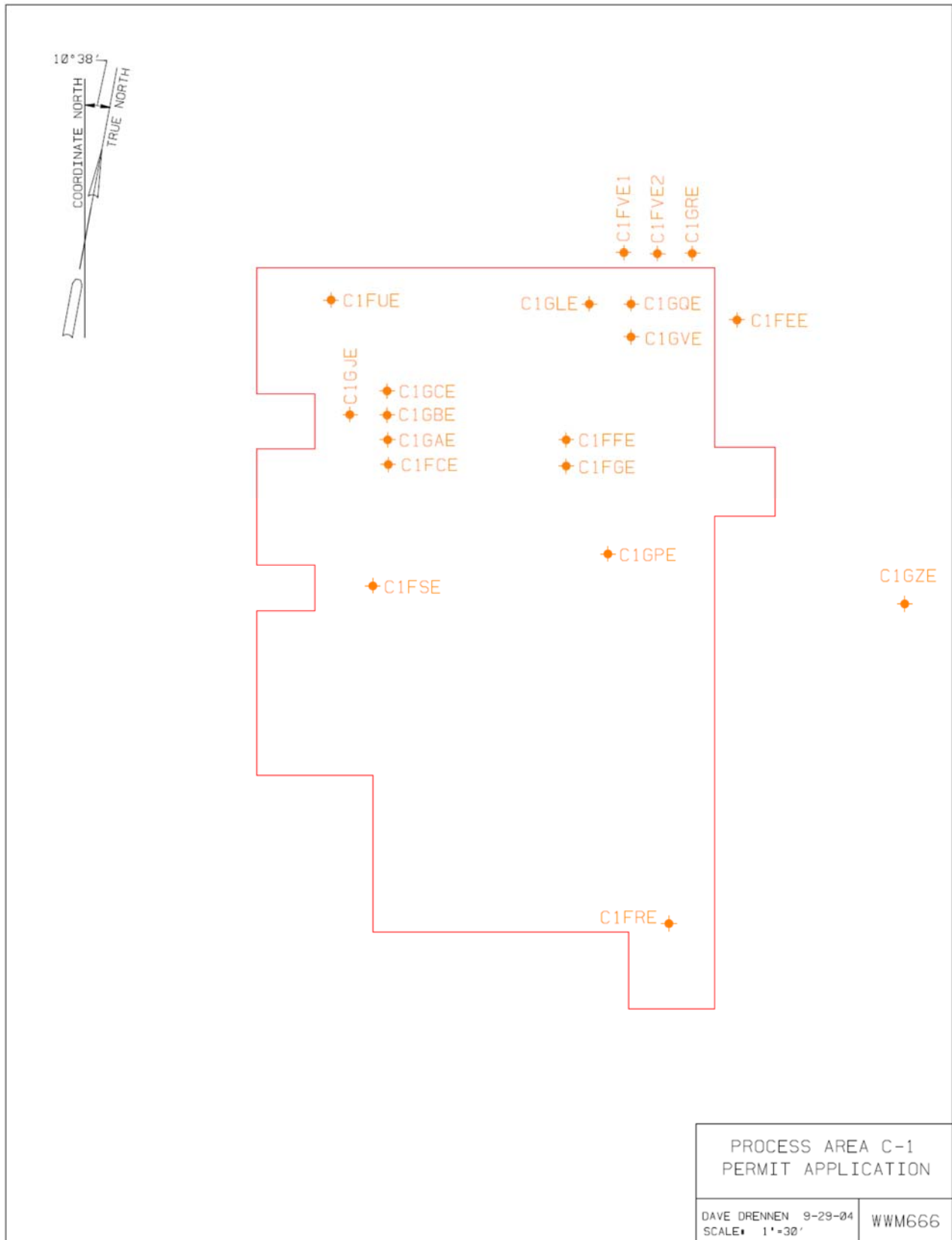
As of January 2, 2011, pursuant to actions taken by the USEPA, Greenhouse Gases (GHGs) became a regulated pollutant under the major NSR program. As such, an evaluation must be done for any increase in GHG emissions resulting from construction or modification to determine PSD applicability per 40 CFR 52.21. There are no new emissions of components listed in table A-1 of 40 CFR 98.2 therefore PSD for GHG does not apply.

For Monitoring, Recordkeeping, and Reporting, please read Attachment O of the equipment sheets.

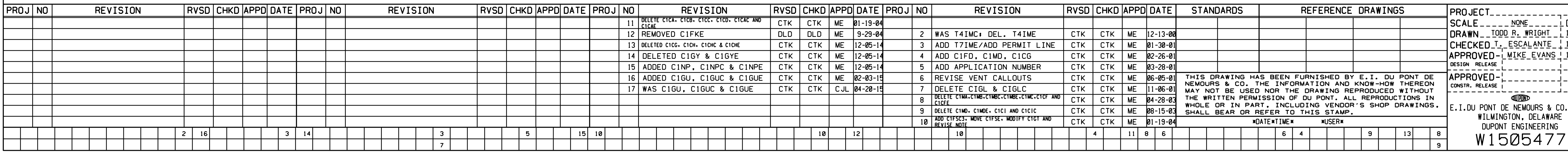
## Requested Changes Summary for R13-2365

Permit No.	Condition No.	Description of Proposed Permit Change
R13-2365E	Table A.1.	For emission point C1FQE, increase tpy VOC from 21.00 to 21.76.
		For emission point C1FWE, increase VOC from 26.55 pph to 32.2 pph, and 0.29 tpy to 0.35 tpy.
		Add emission point C1GZE for source C1GZ routed through control device C1GZC, with air pollutant emissions of VOC (0.51 pph and 0.18 tpy), HF (0.01 pph and 0.01 tpy), PM (0.01 pph and 0.01 tpy) and CO (0.01 pph and 0.01 tpy).
R13-2365E	A.6.	Revise first sentence of 2 <sup>nd</sup> paragraph to state: "Monitoring shall be conducted at least once per month."
R13-2365E	Table B.3.(a)	Add control device C1GZC – Spray Tower with Vacuum Pump – If water flow to the vacuum pump is $\leq 2$ gpm, the heaters will automatically shut down.
R13-2365E	Table B.3.(b)	Add C1GZC, Vacuum Pump, Min. Water Flow (gpm) as the parameter to be monitored.
R13-2365E	Table B.8.	The middle column header should be changed to remove "Consent Order", replacing it with "R13-3223."
R13-2365E	B.8., page 10	Replace references to "CO-R21-97-47" with "R13-3223." Eliminate reference to Attachment D in the permit text and eliminate attachment D at the end of the permit by referencing to R13-3223.

## Plot Plan



## Detailed Process Flow Diagrams





## Attachment G

### Process Description

## C1-P Process Description

PFA is a copolymer of various monomers produced in a semi-batch polymerization process. The reaction requires a pre-charge of water, ethane, aqueous fluorosurfactants, water-soluble initiator salts and the monomers. During polymerization, the monomers and some make-up initiator are continually added to the reactor. The system is also designed to produce a low molecular weight Poly-TFE product, which is similar to PFA.

At batch end, un-reacted monomers will be vented down to 5 psig to the Thermal Converter (T7IMC) covered by permit 1823. When the Thermal converter is not operational, the unreacted monomers will be vented to Monomer's internal recovery device (T1GN). From 5 psig to a slight vacuum, the reactor will be vented to the atmosphere. See emissions summary sheet for vented amounts.

The aqueous emulsion produced in the reactor is transferred to the Isolation facility for further processing and then transferred to the Finishing system. Some of the aqueous surfactant added during polymerization is driven off in the drying step, and recovered by C1FSC2 and C1FSC3.

The dried polymer is pneumatically conveyed to various vessels, compacted, and then extruded to produce small pellets or cubes. A small amount of dry polymer bypasses the extruder and is packed out as fluff.

The cubes are blended in downstream facilities, and then either packed out for sale to customers, or transferred to the fluorination facilities. Material sent to the fluorination facilities is transferred into a reactor where the polymer end groups react with a fluorine/nitrogen mixture to produce a more stable product. The un-reacted fluorine and reaction byproducts are vented to C1FEC. The cubes are then cooled, sampled, and packed out for sale to customers.

The changes submitted in this Class II Administrative update R13-2365F include:

1. Revised emissions calculations to reinstate emissions from the ingredient feed system (C1FW) through the reactor (C1FQ) to emission point (C1FQE), which were inadvertently removed in the application filed for R13-2365E. This includes increasing the hourly VOC emission rate for C1FQE from 21.00 to 21.76 tons per year.
2. Revised emissions calculations to reinstate emissions from the ingredient feed system (C1FW) to emission point C1FWE, which were inadvertently removed in the application filed for R13-2365E. This includes increasing the hourly VOC emission rate from 26.55 pph to 32.2 pph, and from 0.29 tons per year VOCs to 0.35 tons per year.
3. Revised calculations to include acetonitrile being emitted in <0.01 lbs/hr and <0.01 tons/year from source C1FW to emission point C1FWE.
4. Revised calculations for C1GX (ingredient system charge pot) to account for emissions that occur while inventorying the charge pot, increasing total VOC emissions from emission point C1GXE from 0.29 to 0.31 tons/year.
5. Added C2EQ (an oven) from area C2 as source C1GZ, venting to a vacuum pump (C1GZC), then to emission point C1GZE. The atmospheric emissions from the oven are 0.51 lbs/hr and 0.18 tons/year VOCs, hydrofluoric acid emissions are expected to be trace, as are PM emissions; CO emissions are estimated to be 0.01 lbs/hr and 0.01 tons/year.

## Attachment H

### MSDS Sheets

## Material Safety Data Sheet

**Perfluoroethyl vinyl ether**

Version 2.2

Revision Date 09/08/2014

Ref. 130000015609

This SDS adheres to the standards and regulatory requirements of the United States and may not meet the regulatory requirements in other countries.

**SECTION 1. PRODUCT AND COMPANY IDENTIFICATION**

Product name : Perfluoroethyl vinyl ether  
Tradename/Synonym : PEVE  
Pentafluoroethyl Trifluorovinyl Ether

MSDS Number : 130000015609

Product Use : Monomer

Manufacturer : DuPont  
1007 Market Street  
Wilmington, DE 19898

Product Information : +1-800-441-7515 (outside the U.S. +1-302-774-1000)  
Medical Emergency : 1-800-441-3637 (outside the U.S. 1-302-774-1139)  
Transport Emergency : CHEMTREC: +1-800-424-9300 (outside the U.S. +1-703-527-3887)

**SECTION 2. HAZARDS IDENTIFICATION**

Potential Health Effects

Carcinogenicity

None of the components present in this material at concentrations equal to or greater than 0.1% are listed by IARC, NTP, or OSHA, as a carcinogen.

**SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS**

Component	CAS-No.	Concentration
Perfluoroethyl vinyl ether	10493-43-3	>99%

## Material Safety Data Sheet

**Perfluoroethyl vinyl ether**

Version 2.2

Revision Date 09/08/2014

Ref. 130000015609

**SECTION 4. FIRST AID MEASURES**

- |                |   |
|----------------|---|
| Skin contact   | : Flush area with lukewarm water. Do not use hot water. If frostbite has occurred, call a physician.  |
| Eye contact    | : Immediately flush eyes for at least 15 minutes. Get medical attention.  |
| Inhalation     | : If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician. |
| Ingestion      | : Is not considered a potential route of exposure.  |
| General advice | : When symptoms persist or in all cases of doubt seek medical advice.   |

**SECTION 5. FIREFIGHTING MEASURES**

- |   |   |
|---|---|
| Flammable Properties                            |   |
| Flash point                                     | : Not applicable  |
| Auto-ignition temperature                       | : 175 °C (347 °F)   |
| Lower explosion limit/ lower flammability limit | : Type : lower flammability limit , 3 vol%  |
| Upper explosion limit/ upper flammability limit | : Type : upper flammability limit , 73 vol%   |
| Fire and Explosion Hazard                       | : Vapours are heavier than air and may spread along floors. Vapours or gases may travel considerable distances to ignition source and flash back.<br><br>Hazardous gases/vapors produced are:<br><br>Hydrogen fluoride<br><br>potentially toxic fluorinated compounds |
| Suitable extinguishing media                    | : Water spray, Foam, Dry chemical, Carbon dioxide (CO2)   |

## Material Safety Data Sheet

**Perfluoroethyl vinyl ether**

Version 2.2

Revision Date 09/08/2014

Ref. 130000015609

Firefighting Instructions : Wear self-contained breathing apparatus and protective suit. Wear neoprene gloves during cleaning up work after a fire. Evacuate personnel and keep upwind of fire. Cool containers/tanks with water spray. Protect from hydrogen fluoride fumes which react with water to form hydrofluoric acid.

**SECTION 6. ACCIDENTAL RELEASE MEASURES**

NOTE: Review FIRE FIGHTING MEASURES and HANDLING (PERSONNEL) sections before proceeding with clean-up. Use appropriate PERSONAL PROTECTIVE EQUIPMENT during clean-up.

Safeguards (Personnel) : Refer to protective measures listed in sections 7 and 8. Evacuate personnel to safe areas. Ventilate the area. Keep upwind of leak - evacuate until gas has dispersed. Wear self-contained breathing apparatus and protective suit.

**SECTION 7. HANDLING AND STORAGE**

Handling (Personnel) : Avoid inhalation. Avoid contact with skin, eyes and clothing. Wash hands thoroughly after handling. Wash clothing after use. Keep away from fire, sparks and heated surfaces. Wash hands and face before breaks and immediately after handling the product. Do not contaminate tobacco products.

Handling (Physical Aspects) : When transferring from one container to another apply earthing measures and use conductive hose material. Mixture may charge electrostatically: always use earthing leads when transferring from one container to another. The product should only be used in areas from which all naked lights and other sources of ignition have been excluded. Prevent the creation of flammable or explosive concentrations of vapour in air and avoid vapour concentration higher than the occupational exposure limits. Vapours may form explosive mixtures with air. Vapours are heavier than air and may spread along floors.

Storage : Keep tightly closed. Store in a well-ventilated area away from heat and sunlight. Observe precautions for storage of compressed gases.

**SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION**

## Material Safety Data Sheet

**Perfluoroethyl vinyl ether**

Version 2.2

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Ref. 130000015609

- Engineering controls : Use only with adequate ventilation especially for enclosed and low area where vapors can accumulate.
- Personal protective equipment
- Respiratory protection : When workers are facing concentrations above the exposure limit they must use appropriate certified respirators. Wear NIOSH approved positive pressure air-supplied respirator. Provide adequate ventilation.
- Hand protection : Material: Neoprene
- Eye protection : Wear coverall chemical splash goggles. Additionally wear a face shield where the possibility exists for face contact due to splashing, spraying or airborne contact with this material.
- Skin and body protection : Where there is potential for skin contact have available and wear as appropriate impervious gloves, apron, pants, and jacket.

Exposure Guidelines  
Exposure Limit Values

Perfluoroethyl vinyl ether  
AEL \* (DUPONT) 200 ppm 8 & 12 hr. TWA

\* AEL is DuPont's Acceptable Exposure Limit. Where governmentally imposed occupational exposure limits which are lower than the AEL are in effect, such limits shall take precedence.

**SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES**

- Form : Liquefied gas
- Color : colourless
- Odor : odourless
- Boiling point : 7.4 °C (45.3 °F) at 1,013 hPa
- % Volatile : 100 %
- Water solubility : negligible

## Material Safety Data Sheet

**Perfluoroethyl vinyl ether**

Version 2.2

Revision Date 09/08/2014

Ref. 130000015609

**SECTION 10. STABILITY AND REACTIVITY**

- Conditions to avoid : Stable at normal temperatures and storage conditions. Decomposes slowly in air. Decomposes on heating.
- Incompatibility : Strong oxidizing agents
- Hazardous decomposition products : Hazardous decomposition products: Hydrogen fluoride, Fluorinated compounds
- Hazardous reactions : Polymerization will occur only in the presence of chemical initiators.

**SECTION 11. TOXICOLOGICAL INFORMATION**

- Perfluoroethyl vinyl ether  
Inhalation 4 h LC50 : > 21000 ppm , Rat
- Repeated dose toxicity : Inhalation  
Rat
- No toxicologically significant effects were found.
- Mutagenicity : Tests on bacterial or mammalian cell cultures did not show mutagenic effects.  
Animal testing did not show any mutagenic effects.

**SECTION 12. ECOLOGICAL INFORMATION**

- Aquatic Toxicity  
Perfluoroethyl vinyl ether : no data available
- Environmental Fate
- Perfluoroethyl vinyl ether  
Biodegradability : 20 % OECD Test Guideline 301D



## Material Safety Data Sheet

**Perfluoroethyl vinyl ether**

Version 2.2

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Not readily biodegradable.

**SECTION 13. DISPOSAL CONSIDERATIONS**

- Waste Disposal : Treatment, storage, transportation, and disposal must be in accordance with applicable federal, state/provincial, and local regulations.
- Container Disposal : Remove labels and thoroughly clean containers prior to recycling or reuse.

**SECTION 14. TRANSPORT INFORMATION**

DOT	UN number	: 3154
	Proper shipping name	: Perfluoro(ethyl vinyl ether)
	Class	: 2.1
	Labelling No.	: 2.1
IATA_C	UN number	: 3154
	Proper shipping name	: Perfluoro (ethyl vinyl ether)
	Class	: 2.1
	Labelling No.	: 2.1
IMDG	UN number	: 3154
	Proper shipping name	: PERFLUORO
	Class	: 2.1
	Labelling No.	: 2.1

**SECTION 15. REGULATORY INFORMATION**

- TSCA (US) Status : On the inventory, or in compliance with the inventory
- SARA 313 Regulated Chemical(s) : This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.
- California Prop. 65 : Chemicals known to the State of California to cause cancer, birth defects or any other harm: none known

## Material Safety Data Sheet

**Perfluoroethyl vinyl ether**

Version 2.2

Revision Date 09/08/2014

Ref. 130000015609

**SECTION 16. OTHER INFORMATION**

Restrictions for use : Do not use DuPont materials in medical applications involving implantation in the human body or contact with internal body fluids or tissues unless the material has been provided from DuPont under a written contract that is consistent with DuPont policy regarding medical applications and expressly acknowledges the contemplated use. For further information, please contact your DuPont representative. You may also request a copy of the DuPont POLICY Regarding Medical Applications and DuPont CAUTION Regarding Medical Applications.

The DuPont Oval Logo is a registered trademark of E.I. du Pont de Nemours and Company. Before use read DuPont's safety information. For further information contact the local DuPont office or DuPont's nominated distributors.

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

Significant change from previous version is denoted with a double bar.

## SAFETY DATA SHEET

**Perfluoropropyl Vinyl Ether**

Version 3.1

Revision Date 2014/09/05

Document no. 130000017112

This SDS adheres to the standards and regulatory requirements of China and may not meet the regulatory requirements in other countries.

**Section 1 - Chemical and Enterprise Identification****Product name** : Perfluoropropyl Vinyl Ether**Product name in English** : Perfluoropropyl Vinyl Ether**Other names** : PFVE  
PPVE**Recommended use of the chemical and restriction on use**Recommended use : Monomer  
Monomer

Restrictions on use : For industrial use only.

**Manufacturer or supplier's details**

Company : Du Pont China Holding Co., Ltd

Street address : China, Shanghai, 399 KeYuan Road, Bldg 11, Zhangjiang Hi-Tech Park, Pudong  
New District 201203

Telephone : 86 21 3862 2888

Telefax : 86 21 3862 2889

E-mail address : AP-CN-OTHER-SHZHANG-CHINA-PS&amp;R-CC@dupont.com

**Emergency telephone number** : 86 532 8388 9090**Date of first preparation** : 2010/12/06**Section 2 - Hazard Identification****GHS Hazard Category**

Flammable liquids : Category 2

Endpoints which are not classified, cannot be classified or are not applicable are not shown.

**Label content**

Pictogram :



Signal word : Danger

Hazardous warnings : Highly flammable liquid and vapour.

Precautionary statements

**Preventive Measures:**

Keep away from heat/sparks/open flames/hot surfaces. - No smoking.

Keep container tightly closed.

Ground/bond container and receiving equipment.

Use explosion-proof electrical/ ventilating/ lighting/ equipment.

**Perfluoropropyl Vinyl Ether**

Version 3.1

Revision Date 2014/09/05

Document no. 130000017112

Use only non-sparking tools.

Take precautionary measures against static discharge.

Wear protective gloves/ eye protection/ face protection.

**Accident Response:**

IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.

In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.

**Safe Storage:**

Store in a well-ventilated place. Keep cool.

**Waste Disposal:**

Dispose of contents/ container to an approved waste disposal plant.

**Other hazards**

Vapours may cause irritation to the eyes, respiratory system and the skin. Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing.

**Main Symptom After Contact**

No information available.

**Section 3 - Ingredients/Composition Information****Chemical nature** : Substance**Components**

Chemical Name	CAS-No.	Concentration
Perfluoropropyl vinyl ether	1623-05-8	>=97%
Fluorocarbons		<=3%

**Section 4 - First-aid Measures****Inhalation** : Remove from exposure, lie down. Move to fresh air. Keep patient warm and at rest. Artificial respiration and/or oxygen may be necessary. Consult a physician.**Skin contact** : In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.**Eye contact** : Hold eyelids apart and flush eyes with plenty of water for at least 15 minutes. Get medical attention.**Ingestion** : Do not induce vomiting. If conscious, give 2 glasses of water. Get immediate medical attention.**Most important symptoms/effects, acute and delayed** : No information available.**Protection of first-aiders** : If potential for exposure exists refer to Section 8 for specific personal protective equipment.**Notes to physician** : No information available.**Section 5 - Fire-fighting Measures**

## SAFETY DATA SHEET

**Perfluoropropyl Vinyl Ether**

Version 3.1

Revision Date 2014/09/05

Document no. 130000017112

- Suitable extinguishing media** : Carbon dioxide (CO2), Foam, Dry chemical
- Specific hazards** : Vapours are heavier than air and may spread along floors. Vapours or gases may travel considerable distances to ignition source and flash back. Hazardous decomposition products Fluorinated compounds Flammable liquid Hydrofluoric acid...%, Carbon monoxide
- Special protective equipment for firefighters** : In the event of fire, wear self-contained breathing apparatus. Wear suitable protective equipment.
- Specific extinguishing methods** : No information available.
- Further information** : Evacuate personnel and keep upwind of fire. Use extinguishing measures that are appropriate to local circumstances and the surrounding environment. Shut off source of fuel, if possible and without risk. Cool containers/tanks with water spray. Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations.

**Section 6 - Leak Emergency Treatment**

- Protective measures, devices and emergency treatment procedure for workers** : Evacuate personnel to safe areas. Ventilate the area. Refer to protective measures listed in sections 7 and 8. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.
- Environmental precautions** : Prevent further leakage or spillage. Prevent product from entering drains. Prevent spreading over a wide area (e.g. by containment or oil barriers). Should not be released into the environment.
- Methods and materials for containment and cleaning up** : Remove all sources of ignition. Dike spill. Cover with dry sodium carbonate.
- Prevention of secondary hazards** : No information available.
- Additional advice** : Never return spills in original containers for re-use.

**Section 7 - Operation Handling and Storage****Operation Handling**

- Technical measures/Precautions** : Avoid breathing vapours or mist. Avoid contact with skin, eyes and clothing. Wash hands thoroughly after handling. Wash clothing after use. Keep container tightly closed. Use in well ventilated area away from possible ignition sources. Keep away from heat and flame.

## SAFETY DATA SHEET

**Perfluoropropyl Vinyl Ether**

Version 3.1

Revision Date 2014/09/05

Document no. 130000017112

**Precautions for safe handling** : When transferring from one container to another apply earthing measures and use conductive hose material. Mixture may charge electrostatically: always use earthing leads when transferring from one container to another. The product should only be used in areas from which all naked lights and other sources of ignition have been excluded. Prevent the creation of flammable or explosive concentrations of vapour in air and avoid vapour concentration higher than the occupational exposure limits. Vapours may form explosive mixtures with air. Vapours are heavier than air and may spread along floors.

**Storage**

**Suitable storage conditions** : Keep in a cool, well-ventilated place.

**Section 8 - Exposure Control and Personal Protection****Control parameters**

No information available.

**Engineering controls** : Use only with adequate ventilation especially for enclosed and low area where vapors can accumulate.

**Biological occupational exposure limits** : No information available.

**Personal protective equipment**

**Respiratory protection** : When workers are facing concentrations above the exposure limit they must use appropriate certified respirators. Provide adequate ventilation.

**Hand protection** : Material: Neoprene  
Protective gloves complying with EN 374.

**Eye protection** : Wear coverall chemical splash goggles., Additionally wear a face shield where the possibility exists for face contact due to splashing, spraying or airborne contact with this material.

**Skin protection** : If there is a potential for contact with hot/molten material wear heat resistant clothing and footwear.  
Regular cleaning of equipment, work area and clothing.

**Hygiene measures** : Wash hands and face before breaks and immediately after handling the product.  
Do not contaminate tobacco products.

**Section 9 - Physical and Chemical Properties****Appearance (Physical state, form, colour, etc.)**

**Physical state** : liquid  
**Form** : liquid  
**Colour** : colourless

**Odour** : odourless

**Odour Threshold** : No information available.

**Perfluoropropyl Vinyl Ether**

Version 3.1

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<b>pH</b>	: No information available.
<b>Melting point/freezing point</b>	
Melting point	: < -35 °C
<b>Boiling point, initial boiling point and boiling range</b>	
Boiling point	: 36 °C
<b>Flash point</b>	: -20 °C Method: Tag closed cup - TCC
<b>Evaporation rate</b>	: 55 (Butyl Acetate=1.0)
<b>Flammability (solid, gas)</b>	: No information available.
<b>Upper/lower flammability or explosive limits</b>	
Upper explosion limit	: 47 vol%
Lower explosion limit	: 1.1 vol%
<b>Vapour pressure</b>	: 1,100 hPa (37 °C)
<b>Vapour density</b>	: 11 (Air = 1.0)
<b>Density</b>	
Density	: 1.53 g/cm3 (25 °C)
<b>Solubility(ies)</b>	
Water solubility	: No information available.
<b>Partition coefficient: n-octanol/water</b>	: No information available.
<b>Auto-ignition temperature</b>	
Auto-ignition temperature	: 157 °C
<b>Decomposition temperature</b>	: No information available.
<b>Viscosity</b>	
Viscosity, kinematic	: No information available.
<b>Molecular weight</b>	: No information available.

**Section 10 - Stability and Reactivity**

<b>Reactivity</b>	: No information available.
<b>Chemical stability</b>	: Slowly oxidizes in the presence of air to form acid fluoride.
<b>Possibility of hazardous reactions</b>	: Polymerization will occur only in the presence of chemical initiators.
<b>Conditions to avoid</b>	: Decomposes on heating. Stable at normal temperatures and storage conditions. Heating can release hazardous gases.

## Perfluoropropyl Vinyl Ether

Version 3.1

Revision Date 2014/09/05

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**Materials to avoid** : strong oxidizers

**Hazardous decomposition products** : acid fluorides, Fluorinated compounds

### Section 11 - Toxicological Information

#### Acute toxicity

Inhalation

Perfluoropropyl vinyl ether : LC50/4 h/Rat(vapour): > 58.7 mg/l

#### Skin corrosion/irritation

No information available.

#### Serious eye damage/eye irritation

No information available.

#### Respiratory or skin sensitisation

No information available.

#### Germ cell mutagenicity

Perfluoropropyl vinyl ether : Tests on bacterial or mammalian cell cultures did not show mutagenic effects. Evidence suggests this substance does not cause genetic damage in animals.

#### Carcinogenicity

No information available.

#### Reproductive toxicity

No information available.

#### Specific Target Organ Toxicity

Specific target organ toxicity - repeated exposure

Perfluoropropyl vinyl ether : The substance or mixture is not classified as specific target organ toxicant, repeated exposure.

#### Aspiration hazard

No information available.

#### Other

Perfluoropropyl vinyl ether : Repeated dose toxicity:  
Inhalation/Rat  
No toxicologically significant effects were found.

### Section 12 - Ecological Information

#### Ecotoxicity effects

Acute and prolonged toxicity to fish

Perfluoropropyl vinyl ether : LC50/96 h/Lepomis macrochirus (Bluegill sunfish): 1,088 mg/l

#### Persistence and degradability

No information available.



## SAFETY DATA SHEET

**Perfluoropropyl Vinyl Ether**

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**Bioaccumulation**

No information available.

**Mobility in soil**

No information available.

**Other adverse effects**

No information available.

**Section 13 - Waste Disposal**

**Waste disposal methods** : In accordance with local and national regulations. Reseal and return the container to any authorized DuPont refilling facility.

**Contaminated packaging** : Empty containers should be taken to an approved waste handling site for recycling or disposal.

**Section 14 - Transport Information****China Dangerous Goods Regulation**

UN number : 1993  
Proper shipping name : FLAMMABLE LIQUID, N.O.S.  
Class : 3  
Packing group : II

**IMDG**

UN number : 1993  
Proper shipping name : FLAMMABLE LIQUID, N.O.S.  
(Perfluoropropylvinyl Ether)  
Class : 3  
Packing group : II  
Marine pollutant : no

**IATA**

UN number : 1993  
Proper shipping name : FLAMMABLE LIQUID, N.O.S.  
(Perfluoropropylvinyl Ether)  
Class : 3  
Packing group : II

Matters needing attention : Not applicable  
for transportation

**Section 15 - Regulatory Information**

Regulation on the Safety Management of Hazardous Chemicals  
Production Safety Law of the People's Republic of China  
Law of the People's Republic of China on Prevention and Treatment of Occupational Disease  
Environmental Protection Law of the People's Republic of China  
Law of the People's Republic of China on the Prevention and Control of Atmospheric Pollution  
Marine Environment Protection Law of the People's Republic of China  
Fire Protection Law of the People's Republic of China  
Law of the People's Republic of China on the Prevention and Control of Environmental Pollution by Solid Wastes  
Occupational exposure limits for hazardous agents in the workplace Part 1 Chemical hazardous agents

**Perfluoropropyl Vinyl Ether**

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(GBZ2.1)

Occupational exposure limits for hazardous agents in the workplace Part 2 Physical agents (GBZ2.2)

General rule for classification and hazard communication of chemicals (GB13690)

Lists of Dangerous Goods (GB12268)

Dangerous goods classification (GB6944)

Common dangerous chemical storage rules (GB15603)

Packaging Symbols of Dangerous Goods (GB190)

National Hazardous Waste Inventory

**Section 16 - Other Information****References**

SDS Number: 130000017112

**Revision Date/Version**

Date of first preparation : 2010/12/06

Revision Date : 2014/09/10

Version : 3.1

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Significant change from previous version is denoted with a double bar.

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The MSDS format adheres to the standards and regulatory requirements of the United States and may not meet regulatory requirements in other countries.

DuPont  
Material Safety Data Sheet

Page 1

-----  
25610177 TFE MONOMER, TETRAFLUOROETHYLENE  
Revised 18-DEC-2009  
-----

-----  
CHEMICAL PRODUCT/COMPANY IDENTIFICATION  
-----

Material Identification

CAS Number : 116-14-3  
Formula : F<sub>2</sub>CCF<sub>2</sub>  
CAS Name : Ethene, Tetrafluoro

Tradenames and Synonyms

PERFLUOROETHYLENE  
TFE MONOMER  
F-1114  
K-1114  
TETRAFLUOROETHYLENE  
FC-1114

Company Identification

MANUFACTURER/DISTRIBUTOR  
DuPont Washington Works  
Parkersburg, WV

PHONE NUMBERS

Transport Emergency : CHEMTREC 800-424-9300

-----  
COMPOSITION/INFORMATION ON INGREDIENTS  
-----

Components

Material	CAS Number	%
TETRAFLUOROETHYLENE	116-14-3	99.95
VARIOUS FLUOROCARBONS		0.05

-----  
HAZARDS IDENTIFICATION  
-----

Potential Health Effects

Based on animal data, repeated or excessive overexposure by inhalation to Tetrafluoroethylene may cause pathological changes in the kidneys and liver.  
DuPont controls Tetrafluoroethylene as a potential carcinogenic hazard. Data indicate that this material may cause cancer.

25610177

DuPont  
Material Safety Data Sheet

Page 2

## (HAZARDS IDENTIFICATION - Continued)

## Carcinogenicity Information

The following components are listed by IARC, NTP, OSHA or ACGIH as carcinogens.

Material	IARC	NTP	OSHA	ACGIH
TFE MONOMER, TETRAFLUOROETHYLENE	2B	X		A3

DuPont controls the following materials as carcinogens:  
TFE MONOMER, TETRAFLUOROETHYLENE.

-----  
FIRST AID MEASURES  
-----

## # First Aid

## INHALATION

If inhaled, immediately remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

## SKIN CONTACT

The compound is not likely to be hazardous by skin contact but cleansing the skin after use is advisable. Treat for frostbite if necessary by gently warming affected area.

## EYE CONTACT

In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Call a physician.

## INGESTION

Ingestion is not considered a potential route of exposure.

-----  
FIRE FIGHTING MEASURES  
-----

## Flammable Properties

## Flammable limits in Air, % by Volume

LEL	: 12
UEL	: 52
Autoignition	: 218 C (424 F)

Actual Autoignition Temperature (AIT) can be affected by the concentration of vapors and oxygen, vapor/air contact time, pressure, volume, catalytic impurities, etc. Process conditions should be analyzed to determine if the AIT's may be higher or lower.

25610177

DuPont  
Material Safety Data Sheet

Page 3

## (FIRE FIGHTING MEASURES - Continued)

Flammable gas. Vapor forms explosive mixture with air. Vapors or gases may travel considerable distances to ignition source and flash back. Hazardous gases/vapors produced in fire are hydrogen fluoride (HF), potentially toxic fluorinated compounds.

## Fire and Explosion Hazards:

Flammable and highly reactive gas; in the absence of air, TFE can decompose with explosive force if ignition source is present.

Flammable gas. Vapor forms explosive mixture with air. Vapors or gases may travel considerable distances to ignition source and flash back. Hazardous gases/vapors produced in fire are hydrogen fluoride (HF), potentially toxic fluorinated compounds.

## Fire and Explosion Hazards:

Flammable and highly reactive gas; in the absence of air, TFE can decompose with explosive force if ignition source is present.

## Extinguishing Media

Dry Chemical, CO2, Water Spray.

## Fire Fighting Instructions

Evacuate personnel to a safe area. Keep personnel removed and upwind of fire. Wear self-contained breathing apparatus (SCBA) and full protective equipment. Shut off source of fuel, if possible and without risk. Cool tank/container with water spray. Fight fire from a distance, heat may rupture containers. Hydrogen fluoride fumes emitted during a fire can react with water to form hydrofluoric acid. Wear neoprene gloves when handling refuse from fire.

After fire is out, sufficient water should be used to remove residual HF from area.

-----  
ACCIDENTAL RELEASE MEASURES  
-----

## Safeguards (Personnel)

NOTE: Review FIRE FIGHTING MEASURES and HANDLING (PERSONNEL) sections before proceeding with clean-up. Use appropriate PERSONAL PROTECTIVE EQUIPMENT during clean-up.

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Material Safety Data Sheet

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## (ACCIDENTAL RELEASE MEASURES - Continued)

Evacuate personnel, thoroughly ventilate area, use self-contained breathing apparatus. Wear self-contained breathing apparatus (SCBA) and full protective gear. Keep upwind of leak - evacuate until gas has dispersed. Eliminate all sources of ignition - heat, sparks, flame, electricity, impact and friction.

## EMERGENCY EXPOSURE LIMITS (EELs)

DuPont EELs are set for emergency situations, such as a spill or accidental release of a chemical. They specify brief durations and concentrations from which escape is feasible without any escape-impairing or irreversible effects on health. EELs are only applicable to emergency situations where occurrence is expected to be rare in the lifetime of an individual.

## TETRAFLUOROETHYLENE

EEL : 100,000 ppm-min for 60 minutes  
Ceiling 20,000 ppm

## EMERGENCY RESPONSE PLANNING GUIDELINES

## CHEMICAL NAME: TETRAFLUOROETHYLENE

ERPG-1 : 200 ppm  
ERPG-2 : 1,000 ppm  
ERPG-3 : 10,000 ppm

ERPG values are established by the American Industrial Hygiene Association (AIHA), and are defined as follows: The maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to one hour without:

- (1) experiencing other than mild, transient adverse health effects or without perceiving a clearly defined objectionable odor (ERPG-1).
- (2) experiencing or developing irreversible or other serious health effects or symptoms which could impair an individual's ability to take protective action (ERPG-2).
- (3) experiencing or developing life-threatening health effects (ERPG-3).

## Spill Clean Up

Allow to evaporate or disperse leaks in air.

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## (ACCIDENTAL RELEASE MEASURES - Continued)

## # Accidental Release Measures

Use a detector to determine vapor presence before returning personnel to area without masks. Explosion meters must be approved for use in TFE Service. TFE has been found to cause certain explosion meters to fail so they do not detect the presence of flammable mixtures.

Detectors approved for TFE use are: MSA 2A explosimeter (& no others by MSA or anyone); Miran 1BX IR air analyzer (battery powered only); TIF model HLD440 halogen leak detector; OVA 108 and 128 organic vapor analyzer. Crowcon Detection Instruments, Ltd. Model Triple Plus combustible gas detector with %LEL, % Oxygen, and ppm CO detection. (Meter has been replaced with an updated model "Triple Plus +".)

-----  
HANDLING AND STORAGE  
-----

## Handling (Personnel)

Avoid breathing gas. Avoid contact with eyes, skin or clothing.

## Handling (Physical Aspects)

Keep away from heat, sparks and flame. All electrical devices (except for motors) containing any type of electrical contacts must be either intrinsically safe, or be hermetically sealed, or be oil-immersed, or be enclosed in an air or N2 purged enclosure. In addition, all electrical devices (including motors) must have a temperature rating no higher than T2C (US), or T3 (Europe), or their equivalent.

Electrical motors must be 3 phase, TEFC (totally enclosed fan cooled), with contacts, if so equipped, that are non-arcing. All electrical equipment with heated surfaces (including lighting fixtures) must not have an operating temperature greater than 245 deg C (TFE's AIT). For equipment having large surface areas (including pipelines, large process heaters, etc) the temperature limit is 80% of this value (i.e., 196 deg C). Because of a TFE flame's ability to pass the smallest gap tested in UL tests, its electrical classification is Class 1, Division 1 or 2, Group C + TFE.

## Storage

Store in a well ventilated place. Store away from heat, sparks and flames, ignition sources, oxidizers, combustibles. Store below -30 C (-22 F).

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## (HANDLING AND STORAGE - Continued)

Uninhibited liquid TFE above -30 deg C or uninhibited TFE gas above 100 psig at room temperature, are not safe to handle or store without attention being given to vessel and personnel protection devices and enclosures. Uninhibited TFE is subject to autopolymerization. The resultant polymer ball is the most likely "normal" ignition source for TFE when it comes in contact with TFE vapor.

-----  
EXPOSURE CONTROLS/PERSONAL PROTECTION  
-----

## Engineering Controls

Use only with adequate ventilation especially for enclosed and low area where vapors can accumulate. Use sufficient ventilation to keep employee exposure below recommended limits.

## Personal Protective Equipment

EYE/FACE PROTECTION: Wear safety glasses or coverall chemical splash goggles.

RESPIRATORS: Where there is potential for airborne exposures in excess of applicable limits, wear NIOSH approved respiratory protection.

PROTECTIVE CLOTHING: Where there is potential for skin contact have available and wear as appropriate impervious gloves, apron, pants, and jacket.

Recommended glove and clothing material: Neoprene, Butyl Rubber.

## Exposure Guidelines

## Exposure Limits

TFE MONOMER, TETRAFLUOROETHYLENE

PEL (OSHA)	: None Established
TLV (ACGIH)	: 2 ppm, 8 Hr. TWA, A3
AEL * (DuPont)	: 2 ppm, 8 & 12 Hr. TWA
	STEL 25 ppm, 15 minute TWA

\* AEL is DuPont's Acceptable Exposure Limit. Where governmentally imposed occupational exposure limits which are lower than the AEL are in effect, such limits shall take precedence.



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PHYSICAL AND CHEMICAL PROPERTIES  
-----

## Physical Data

Boiling Point	: -75.6 C (-104.1 F) 760 mm Hg
Vapor Pressure	: 13360 mm Hg @ 0 deg C
Melting Point	: -142.5 C (-224.5 F)
% Volatiles	: 100 WT%
Solubility in Water	: 7 ppm/psi @ 25 deg C
Odor	: None
Form	: Gas
Color	: Colorless
Specific Gravity	: 1.32 @ -30C
Vapor Density	: 3.53

## Physical Hazards

Liquid TFE will cause severe frost burn.

-----  
STABILITY AND REACTIVITY  
-----

## Chemical Stability

Unstable with heat. Unstable with static charges. Decomposition can cause dangerous pressure build-up in container, an explosion.

## Incompatibility with Other Materials

Incompatible or can react with oxidizers, air. Contact with incompatibles can cause dangerous pressure build-up in container, an explosion.

Also incompatible with hydrogen and ethylene.

## Decomposition

Decomposes with heat.

Decomposition temperature: 470-550 C (878-1022 F)

Hazardous gases or vapors can be released, including hydrogen fluoride (HF), potentially toxic fluorinated compounds.

## Polymerization

Violent polymerization can occur. Conditions leading to polymerization include exposure to air, contamination with free radical initiators, heat, high pressure. Polymerization can cause dangerous pressure build-up in container, an explosion.

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## (STABILITY AND REACTIVITY - Continued)

## Other Hazards

Incompatible with high surface solids like alumina, carbon, silica gel, molecular sieves. Incompatible with metals like zinc, aluminum, and magnesium above their melting points. Incompatible with most oxides and salts that have been activated by heating.

-----  
TOXICOLOGICAL INFORMATION  
-----

## Animal Data

Tetrafluoroethylene  
, Inhalation 4 hour CL50: 31,000 ppm in rats

Single exposure by inhalation to high doses of Tetrafluoroethylene caused kidney damage. Repeated exposure caused kidney damage, testicular effects, increased kidney and liver weight, increased urine fluoride, low blood pressure, and anemia. Long-term exposure caused reduced weight gain, kidney damage, increased urine output, liver effects, testicular effects, cataracts and some mortality.

Data show an increased incidence of tumors and leukemia in laboratory animals. No animal data are available to define the developmental, or reproductive hazards of Tetrafluoroethylene. Tests have shown that Tetrafluoroethylene does not cause genetic damage in bacterial or mammalian cell cultures, or in animals. Tetrafluoroethylene has not been tested for its ability to cause permanent genetic damage in reproductive cells of mammals (not tested for heritable genetic damage).

-----  
ECOLOGICAL INFORMATION  
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## Ecotoxicological Information

## AQUATIC TOXICITY:

No information is available. Toxicity is expected to be low based on insolubility in water.

-----  
DISPOSAL CONSIDERATIONS  
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## Waste Disposal

Treatment, storage, transportation, and disposal must be in accordance with applicable Federal, State/Provincial, and Local regulations.

Discarded material is a RCRA Hazardous Waste. RCRA hazardous waste number is D001

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-----  
REGULATORY INFORMATION  
-----

## U.S. Federal Regulations

## HAZARDOUS CHEMICAL LISTS

CERCLA Hazardous Substance : Yes

TSCA Inventory Status : In compliance with TSCA Inventory  
requirements for commercial purposes.  
Subject to TSCA 12(b) export  
notification.

## TITLE III HAZARD CLASSIFICATIONS SECTIONS 311, 312

Acute : Yes  
Chronic : Yes  
Fire : Yes  
Reactivity : Yes  
Pressure : Yes-----  
OTHER INFORMATION  
-----

## NFPA, NPCA-HMIS

NFPA Rating  
Health : 3  
Flammability : 4  
Reactivity : 3

## Additional Information

## COMMUNITY EXPOSURE GUIDELINES (CEGs)

A DuPont Community Exposure Guideline (CEG) is an exposure guideline established by Haskell Laboratory. The CEG assumes a 24-hour lifetime exposure by all, including the most sensitive individuals, in an exposed community population. Exposure above the CEG will not necessarily result in any adverse effects. Where data indicates that the CEG may be approached or exceeded, Haskell, the appropriate business, and Legal will evaluate what action, if any, should be taken.

## TETRAFLUOROETHYLENE

CEG : 2 ppm

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The data in this Material Safety Data Sheet relates only to the specific material designated herein and does not relate to use in combination with any other material or in any process.

Responsibility for MSDS : REGULATORY AFFAIRS

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(Continued)

Address : DUPONT FLUOROPRODUCTS  
CHESTNUT RUN PLAZA 713  
WILMINGTON, DE 19880-0713  
Telephone : 302-999-2632

# Indicates updated section.

This information is based upon technical information believed to be reliable. It is subject to revision as additional knowledge and experience is gained.

End of MSDS

Attachment I  
Equipment List Form

## Equipment List – Attachment I

Type Change, if any (New, Modification, or Removal)	Date of Change	Emissions Unit (Source)		Air Pollution Control Device		Emission Point	
		ID No.	Source	ID No.	Device Type	ID No.	Emission Type
No Change		C1GH	Ingredient Feed System	T7IMC, None, Recycle	Thermal Converter, None	T7IME,C1FQE	Stack
Modification	2Q/2015	C1FW	Ingredient Feed System	N/A	None	C1FWE, Area	Stack
No Change		C1GX	Tank	N/A	None	C1GXE	Area
Modification	2Q/2015	C1FQ <sup>a</sup>	Reactor	T7IMC, None, Recycle	Thermal Converter, None	T7IME,C1FQE	
No Change		C1GD	Tank	N/A	None	C1GDE	Stack
No Change		C1GK	Sump	N/A	None	Area	Area
No Change		C1FR	Recovery System	N/A	None	C1FRE	Stack
No Change		C1FS	Dryer	C1FSC1,C1FSC2, C1FSC3	Baghouse, Scrubber, DBS	C1FSE	Stack
No Change		C1FK	Conveying System	C1FKC, C1FSC3	Baghouse, DBS	C1FSE	Stack
No Change		C1FU	Bin	N/A	None	C1FUE	Stack
No Change		C1GJ	Conveying System	C1GJC	Baghouse	C1GJE	Stack
No Change		C1GQ	Conveying System	C1GQC	Baghouse	C1GQE	Stack
No Change		C1GV	Hopper	N/A	None	C1GVE	Stack
No Change No change		C1GV C1FV	Hopper Extruder	N/A N/A	None None	C1GVE C1FVE1, C1FVE2	Stack Stack
No change		C1FC, C1GA, C1GB, C1GC	Bin	N/A	None	C1FCE, C1GAE, C1GBE, C1GCE	Stack
No change		C1GS, C1GT	Blender #1, #2	C1GPC	Baghouse	C1GPE	Stack
No change		C1FF, C1FG	Bins	N/A	None	C1FFE, C1FGE	Stack
No change		C1FD	Supply Cylinder	N/A	None	C1FEE	Stack
No change		C1FE	Reactor	C1FEC	Scrubber	C1FEE	Stack
No change		C1GN	Conveying System	C1GNC1 C1GNC2	Baghouse	C1FEE	Stack
No Change		C1FA,C1FB	Bins	N/A	None	C1FEE	Stack
No Change		C1GP	Conveying System	C1GPC	Baghouse	C1GPE	Stack
No change		C1GR	Cleaning station	N/A	None	C1GRE	Stack
No change		C1NP	Recovery System	C1NPC	Scrubber	C1NPE	Stack
Modification	2Q/2015	C1GZ	Oven	C1GZC	Vacuum Pump	C1GZE	Stack

<sup>a</sup> This device can be vented locally or sent back to the Monomer plant where the gasses can be recycled or thermally destroyed. The emissions from such activity are described in R13-1823.

## Attachment J Emission Points Data Summary Sheets

Emission point ID No. <i>(Must match Equipment List Form and Plot plan)</i>	Source(s) Vented Through This Point <sup>1</sup>  <i>(Must match Equipment List Form and Plot plan)</i>		Air Pollution Control Device (Must match Equipment List Form and Plot plan)		Vent Time for Source  <i>(Chemical Processes Only)</i>		All Regulated Pollutants- Chemical Name/CAS <sup>2</sup> <i>(Speciate VOCs &amp; HAPS)</i>	Maximum Potential Uncontrolled		Maximum Potential Controlled Emissions <sup>4</sup>		Emission Form or Phase (At exit conditions, Solid, Liquid, or Gas/Vapor)	Est. Method Used <sup>5</sup>	Emission Concentration <sup>6</sup> (PPMV or Mg/M <sup>3</sup> )	Inner Diameter (Ft.)	Exit Gas			Emission Point Elevation		UTM Coordinates (m)	
	ID No.	Source	ID No.	Device Type	Short Term	Max (Hr/Yr)		Lb/Hr	Ton/Yr	Lb/Hr	Ton/yr					Temp. (F)	Volumetric flow <sup>7</sup> (acfm)	Velocity (fps)	Ground Level	Stack Height <sup>8</sup>		
Area	C1FW	Vinyl Ether Feed System	none		< 1 min per event	< 6 hrs per year	VOC	0.04	0.01	0.04	0.01	Gas	E.E.	1E6	NA	86	<1	NA	630	1	4,346,800M	442,310M
							Acetonitrile 75- 05-8 (HAP)	0.01	0.01	0.01	0.01	Gas	E.E.	<257								
	C1GK	Supernate	None		< 10 min per	< 500 hrs	VOC Non-Regulated ODC Acetonitrile 75- 05-8 (HAP)	1.90 0.20 0.08 0.01	0.20 0.02 0.01 0.01	1.90 0.20 0.08 0.01	0.20 0.02 0.01 0.01	Gas Gas Gas Gas	E.E. E.E. E.E. E.E.	9.36E+05 3309 57000 1984	NA	140	<1	NA	630	0	4,346,800M	442,310M
C1FCE	C1FC	cube bin	None		Continuous	8760	VOC	0.10	0.15	0.10	0.15	Gas	E.E.	10.2	0.25	140	267	90	630	69.7	4,346,800M	442,310M
							Particulate	0.10	0.30	0.10	0.30	Particulate	E.E.	84 mg/M3								
C1FEE	C1FA	Cool down bin	None		Semi- continuous	8760	Fluorides	0.10 0.07	0.15 0.03	0.10 0.07	0.15 0.03	Gas	E.E.	1.4	1.885	Amb.	8690	51.9	630	140	4,346,800M	442,310M
							HF (HAP) Particulate	Trace Trace	Trace Trace	Trace Trace	Trace Trace	Gas Particulate	E.E. E.E.	Trace Trace								
	C1FB	Cool down bin	None		Semi- continuous	8760	Fluorides	0.07	Included with C1FA	0.07	Included with C1FA	Gas	E.E.		1.885	Amb.	8690	51.9	630	140	4,346,800M	442,310M
							HF (HAP) Particulate	Trace Trace		Trace Trace		Gas Particulate	E.E. E.E.	1.4 Trace								
	C1FD	F <sub>2</sub> /N <sub>2</sub> supply cylinder	none		Continuous	8760	Fluorides	0.11	0.001	0.11	0.001	Gas	E.E.	2.23	1.885	Amb.	8000	47.8	630	140	4,346,800M	442,310M
	C1FE	Fluorinator	C1FEC	Scrubber	Continuous	8760	HF (HAP)	1.26	1.08	0.02	0.011	Gas	E.E.	0.508	1.885	Amb.	8000	47.8	630	140	4,346,800M	442,310M
							Fluorides PM10 Non-regulated	2.82 0.34 0.03	5.95 0.29 0.03	0.15 0.26 0.02	0.16 0.22 0.01	Gas Gas Gas	E.E. E.E. E.E.	5.03 8.56mg/m3 0.278								
	C1GN	Cube convey: C1GN to C1FA & C1FB	C1GNC 1 C1GNC 2	Baghouses	Continuous	8760	Particulate	1.37	0.30	0.01	0.01	Particulate	E.E.	.022 mg/M <sup>3</sup>	1.885	<392	8385	50	630	140	4,346,800M	442,310M



Emission point ID No. (Must match Equipment List Form and Plot plan)	Source(s) Vented Through This Point <sup>1</sup> (Must match Equipment List Form and Plot plan)		Air Pollution Control Device (Must match Equipment List Form and Plot plan)		Vent Time for Source (Chemical Processes Only)		All Regulated Pollutants-Chemical Name/CAS <sup>2</sup> (Speciate VOCs & HAPS)	Maximum Potential Uncontrolled Emissions <sup>3</sup>		Maximum Potential Controlled Emissions <sup>4</sup>		Emission Form or Phase (At exit conditions, Solid, Liquid, or Gas/Vapor)	Est. Method Used <sup>5</sup>	Emission Concentration <sup>6</sup> (PPMV or Mg/M <sup>3</sup> )	Inner Diameter (Ft.)	Exit Gas			Emission Point Elevation		UTM Coordinates (m) NorthingEasting	
	ID No.	Source	ID No.	Device Type	Short Term	Max (Hr/Yr)		Lb/Hr	Ton/Yr	Lb/Hr	Ton/yr					Temp. (F)	Volumetric flow <sup>7</sup> (acfm)	Velocity (fps)	Ground Level	Stack Height <sup>8</sup>		
							Fluorides	Trace	Trace	Trace	Trace	Gas	E.E.									
C1FFE	C1FF	Heat up bin	none		Continuous	8760	VOC	0.12	0.15	0.12	0.15	Gas	E.E.	12.45	0.529	401	560.6	42.4	630	93	4,346,800M	442,310M
C1FGE	C1FG	Heat up bin	none		Continuous	8760	Particulate	0.10	0.30	0.10	0.30	Particulate	E.E.	48 mg/M3	0.529	401	560.6	42.4	630	93	4,346,800M	442,310M
							VOC	0.12	Included in C1FF	0.12	Included in C1FF	Gas	E.E.	12.45								
							Particulate	0.10		0.10		Particulate	E.E.	48 mg/M3								
C1FQE	C1FQ	PFA Polykettle	None		5 min per batch	< 225 hrs/yr	VOC	38.54	21.76	38.54	21.76	Gas	E.E	8.20E+05	0.138	140	7.5	8.4	630	49	4,346,800M	442,310M
							Non-regulated ODC Acetonitrile 75-05-8	2.62	0.07	2.62	0.07	Gas	E.E	138000								
								0.93	0.05	0.93	0.05	Gas	E.E	825								
								0.00	0.00	0.00	0.00	Gas	E.E	400								
	C1GH	TFE feed System	None	< 30 min. per event	15 hrs per year	VOC	4.94	0.08	4.94	0.08	Gas	E.E	990000 ppm	0.138	110	5	6	630	49	4,346,800M	442,310M	
							Non-regulated ODC	0.05	0.01	0.05	0.01	Gas	E.E									10000 ppm
							Trace	Trace	Trace	Trace	Trace	Gas	E.E	Trace								
C1FRE	C1FR	Ammonium Carbonate System	None		10 min per transfer, 10 per day	608 hrs	Ammonia	0.31	0.21	0.31	0.21	Gas	E.E.	582	1	Amb.	1200	25.5	630	25.5	4,346,800M	442,310M
C1FSE	C1FS, C1FK	Torus Disc Dryer & Fluff Conveying	C1FSC1 C1FSC2 C1FSC3	Baghouse Scrubber	Continuous	Cont.	PM10	505.43	888.52	0.23	0.56	Particulate	E.E.	61mg/M^3	0.69	41-140	600-1000	26.9-44.8	630	115	4346744M	441787M
							PM APFO^a VOC	1555.43 5.400 0.65	2638.56 13.425 1.60	0.00 0.220 0.65	0.00 0.543 1.60	Particulate Particulate Gas	EE EE EE	59mg/M^3								
C1FUE	C1FU	Fluff bin above compactor	None		Continuous	Cont.	PM10	0.20	0.22	0.20	0.22	Particulate	E.E.	3080 mg/M <sup>3</sup>	0.166	Amb.	11	8.4	630	52.45	4,346,800M	442,310M
C1FVE1	C1FV	Extruder	None		Continuous	8760	VOC	0.40	0.14	0.40	0.14	Gas	E.E	0.05	3.75 X 2.54	Amb.	22830	39.9	630	27.5	4,346,800M	442,310M
							Fluoride	Trace	Trace	Trace	Gas	E.E	trace									
							PM10 Non-Reg.	0.10 0.01	0.15 0.023	0.10 0.01	0.15 0.023	Liquid Gas	E.E E.E	.571mg/m^3 0.05								
C1FVE2	C1FV	Extruder	None		Continuous	8760	VOC	0.50	0.08	0.50	0.08	Gas	E.E	.24	2.08 x 1.41	Amb.	6802	21.3	630	27.5	4,346,800M	442,310M
							Fluoride	1.63	0.111	1.63	0.111	Gas	E.E	23								
C1FWE	C1FW	Vinyl Ether Feed System	None		< 15 min per event	< 6 hrs per year	VOC	32.20	0.35	32.20	0.35	Gas	E.E	4.00E+05	0.0358	86	<1	15	630	10	4,346,800M	442,310M
							Acetonitrile 75-05-8	0.01	0.01	0.01	0.01	Gas	E.E	36								
C1GAE	C1GA	cube bin	None		Continuous	8760	VOC Particulate	0.04 0.08	Included in C1FC	0.04 0.08	Included in C1FC	Gas Particulate	E.E. E.E.	10.2 84 mg/M3	0.25	140	267	90	630	69.7	4,346,800M	442,310M
C1GBE	C1GB	cube bin	None		Continuous	8760	VOC	0.04	Included in	0.04	Included in	Gas	E.E.	10.2	0.25	140	267	90	630	69.7	4,346,800M	442,310M

Emission point ID No. <i>(Must match Equipment List Form and Plot plan)</i>	Source(s) Vented Through This Point <sup>1</sup>  <i>(Must match Equipment List Form and Plot plan)</i>		Air Polution Control Device (Must match Equipment List Form and Plot plan)		Vent Time for Source  <i>(Chemical Processes Only)</i>		All Regulated Pollutants- Chemical Name/CAS <sup>2</sup> <i>(Speciate VOCs &amp; HAPS)</i>	Maximum Potential  Uncontrolled		Maximum Potential  Controlled Emissions <sup>4</sup>		Emission Form or Phase (At exit conditions, Solid, Liquid, or Gas/Vapor)	Est. Method Used <sup>5</sup>	Emission Concentration <sup>6</sup> (PPMV or Mg/M <sup>3</sup> )	Inner Diameter (Ft.)	Exit Gas			Emission Point Elevation		UTM Coordinates (m) Northing      Easting		
	ID No.	Source	ID No.	Device  Type	Short Term	Max  (Hr/Yr)		Lb/Hr	Ton/Yr	Lb/Hr	Ton/yr					Temp.  (F)	Volumetric flow <sup>7</sup> (acfm)	Velocity  (fps)	Ground  Level	Stack  Height <sup>8</sup>			
							Particulate	0.08	C1FC	0.08	C1FC	Particulate	E.E.	84 mg/M3						630	69.7	4,346,800M	442,310M
C1GCE	C1GC	cube bin	None		Continuous	8760	VOC	0.04	Included in	0.04	Included in	Gas	E.E.	10.2	0.25	140	267	90	630	69.7	4,346,800M	442,310M	
C1GDE	C1GD	Stab Tank	None		< 30 min per event	<1200 hrs per year	VOC  Non-regulated ODC Acetonitrile 05-8      75-	1.89  0.20 0.08 0.01	2.30  0.01 0.01 0.010	1.89  0.20 0.08 0.01	2.30  0.01 0.01 0.010	Gas  Gas Gas Gas	E.E  E.E E.E E.E	11500  41 14 24	0.5	140	30	8.4	630	16	4,346,800M	442,310M	
C1GJE	C1GJ	PFA flake conveying to Flake PO	C1GJC	Baghouse	Intermittent	< 500 hrs  per year	PM10  PM	600.00  2000.00	75.00  250.01	0.87  0.00	0.11  0.00	Particulate	E.E.	2323 mg/M <sup>3</sup>	0.27	Amb.	100	28.7	630	51	4,346,800M	442,310M	
C1GPE	C1GP	Cube conveying system	C1GPC	Baghouse	Semi- continuous	8760	Particulate	11200.00	3000.00	0.01	0.01	Particulate	E.E.	18 mg/M <sup>3</sup>	0.333	Amb.	450	76	630	49.45	4,346,800M	442,310M	
	C1GS	Blender #1	C1GPC	Baghouse	Continuous	8760	Particulate	1.12	2.34	0.06	0.12	Particulate	E.E.	29.6 mg/M <sup>3</sup>	0.333	Amb.	350	68.8	630	49.45	4,346,800M	442,310M	
	C1GT	Blender #2	C1GPC	Baghouse	Continuous	8760	Particulate	1.12	Included in C1GS	0.06	Included in C1GS	Particulate	E.E.	29.6 mg/M <sup>3</sup>	0.333	Amb.	350	68.8	630	49.45	4,346,800M	442,310M	
C1GQE	C1GQ	Fluff convey System: Compactor to feed hopper	C1GQC	Baghouse	Semi-  continuous	8760	PM10  PM	20.00  2000.00	25.00  2500.05	0.10  0.00	0.13  0.00	Particulate	E.E.	2854 mg/M <sup>3</sup>	0.27	Amb.	93.5	26.9	630	60.35	4,346,800M	442,310M	
C1GRE	C1GR	PFA Burnout station	none		Semi- continuous	8760	Fluorides  VOC	0.55  0.01	1.116  0.01	0.55  0.01	1.116  0.01	Gas  Gas	E.E  E.E..	7.2  Trace	2.08 X 1.41	Amb.	6818	38.5	630	27.5	4,346,800M	442,310M	
C1GVE	C1GV	Extruder Feed Hopper	None		Semi- continuous	8760	PM10	0.20	0.22	0.20	0.22	Particulate	E.E.	36590 mg/M <sup>3</sup>	0.166	Amb.	1.2	0.9	630	35	4,346,800M	442,310M	
C1GXE	C1GX	Vinyl Ether charge pot	None		< 10 min per event	< 50 hrs per year	VOC  Acetonitrile 05-8      75-	1.89  Trace	0.31  Trace	1.89  Trace	0.31  Trace	Gas  Gas	E.E..  E.E	1000000  < 257	0.0358	86	<1	15	630	1	4,346,800M	442,310M	
C1NPE	C1NP	Ammonium Carbonate Stripper	C1NPC	Scrubber	Continuous	8760	VOC	0.21	0.90	0.21	0.90	Gas	EE										
C1GZE	C1GZ	Burnout oven	C1GC	Vacuum Pump	6 hours per batch	2500 hrs per year	VOC HF PM CO	0.51 Trace 0.01 0.01	0.18 Trace 0.01 0.01	0.51 Trace Trace 0.01	0.18 Trace Trace 0.01	Gas	EE	150 mg/M <sup>3</sup> 0.15 mg/M <sup>3</sup> 1.78 mg/M <sup>3</sup> 1.43 mg/M <sup>3</sup>	0.833	200	900	27.5	630	50	4346772M	441974M	

The EMISSION POINTS DATA SUMMARY SHEET provides a summation of emissions by emission unit. Note that uncaptured process emission unit emissions are not typically considered to be fugitive and must be accounted for on the appropriate EMISSIONS UNIT DATA SHEET and on the

<sup>1</sup> Indicate by "C" if venting is continuous. Otherwise, specify the average short-term venting rate with units, for intermittent venting (ie., 15 min/hr). Indicate as many rates as needed to clarify frequency of venting (e.g., 5 min/day, 2 days/wk).

<sup>2</sup> List all regulated air pollutants. Speciate VOCs, including all HAPs. Follow chemical name with Chemical Abstracts Service (CAS) number. LIST Acids, CO, CS<sub>2</sub>, VOCs, H<sub>2</sub>S, Inorganics, Lead, Organics, O<sub>3</sub>, NO, NO<sub>2</sub>, SO<sub>2</sub>, SO<sub>3</sub>, etc.  
DO NOT LIST CO<sub>2</sub>, H<sub>2</sub>, H<sub>2</sub>O, N<sub>2</sub>, O<sub>2</sub>, and Noble Gases.

<sup>3</sup> Give maximum potential emission rate with no control equipment operating. If emissions occur for less than 1 hr, then record emissions per batch in minutes (e.g. 5 lb VOC/20 minute batch).

<sup>4</sup> Give maximum potential emission rate with proposed control equipment operating. If emissions occur for less than 1 hr, then record emissions per batch in minutes (e.g. 5 lb VOC/20 minute batch).

<sup>5</sup> Indicate method used to determine emission rate as follows: MB = material balance; ST = stack test (give date of test); EE = engineering estimate; O = other (specify).

<sup>6</sup> Provide for all pollutant emissions. Typically, the units of parts per million by volume (ppmv) are used. If the emission is a mineral acid (sulfuric, nitric, hydrochloric or phosphoric) use units of milligram per dry cubic meter (mg/m<sup>3</sup>) at standard conditions (68 °F and 29.92 inches Hg) (see 45CSR7). If the pollutant is SO<sub>2</sub>,

use units of ppmv (See 45CSR10)

<sup>7</sup> Give at operating conditions. Include inerts.

<sup>8</sup> Release height of emissions above ground level.

a See confidential calculations for the source of these APFO numbers

## Attachment L – Emission Unit Data Sheets

## EQUIPMENT DATA SHEET (TANKS LESS THAN 10,000 GALLONS)

Identification Number\*:           **C1GZ**          

Furnish the following information for each piece of equipment that is a potential or actual source of emissions as shown on the List Form and other parts of application.

1. Name or type of equipment:

PFA Burnout Oven

2. Type of operation:    ☒ Batch                      ☐ Continuous                      ☐ Semi-batch

3. Projected Actual Equipment Operating Schedule (complete appropriate line):-----

_____ hrs/day	_____ days/week	_____ weeks/year
<u>Redacted</u> hrs/ batch	<u>Redacted</u> batches/day, <b>week</b> (Circle one)	<u>52</u> day, <b>weeks/yr</b> (Circle one)

4. Feed Data:

Descriptor Name and CAS No.	Phase <sup>a</sup>	Specific Gravity	Vapor Pressure <sup>b</sup>	Charge Rate			Fill Time (min/batch, run) <sup>c</sup>
				Normal	Max	Units	
Fluoropolymer <sup>1</sup>	S	2.3	0 Psia	Redacted	Redacted	Lb/Batch	N/A

1. CAS# 25067-11-2, or Component PFA
- S = Solid, L = Liquid, G = gas or vapor
  - At feed conditions
  - Total time that equipment is filling per batch or run (start-up), for tank or vessel-type equipment. (solids are put in oven before beginning of run (no emissions))

\*As assigned on *List Form*

5. Give chemical reaction that will be involved (if applicable), including any side reactions that may occur and gases that may be generated during reaction.

☐ Not applicable

☐ Exothermic

☒ Endothermic

Fluoropolymer + Heat (Redacted°C) -----> Melted Fluoropolymer + VOC's + HAP + Regulated Pollutant + CO<sup>2</sup>

Yield of emissions is proportional to residence time of melt in electrically heated oven.

6. Maximum Temperature: Redacted°C Maximum Pressure: 760 mm Hg (A)  
Redacted°F 0 psig

7. Output Data:

Descriptor Name and CAS No.	Phase	Specific Gravity	Vapor Pressure	Hourly or Batch Output Rate		
				Normal	Maximum	Units
Fluoropolymer <sup>3</sup>	L	2.3	0 Psia	Redacted	Redacted	Lb/Batch
Fluoropolymer Particulate <sup>3</sup>	S	2.3	0 Psia	Redacted	Redacted	Lb/Batch
VOC's <sup>1</sup>	G	3.98 Air=1	571.6 Psia @33.34°C	Redacted	Redacted	Lb/Batch
HF (HAP) 7665393	G	0.69 Air=1	940.8 Psia @188.2°C	Redacted	Redacted	Lb/Batch
Regulated Polutant <sup>2</sup>	G	0.97 Air=1	506.8 Psia @-140.2°C	Redacted	Redacted	Lb/Batch
CO <sub>2</sub> 124389	G	1.52 Air=1	1071.9 Psia @31.05°C	Redacted	Redacted	Lb/Batch

1. CAS# 116-15-4 and 116-14-3

2. CAS# 630080

3. CAS# 25067-11-2, or Component PFA

8. Describe any methods, techniques, or devices, including equipment ID number, to be used to control air emissions from this equipment item (indicate set pressure of emergency relief devices):

The heated vapor from the oven containing air pollutant emissions passes to C1GZC, PFA Copoly Berringer Oven Vapor Scrubber . The vapor from C1GZC goes to emission pt. C1GZE.

9. Complete the following emission data for equipment connected to a header exhaust system, giving emissions level before entering header system (i.e. before control equipment):

Emission Point ID\* C1GZE

Check here if not applicable ☐

Descriptor Name and CAS No.	Maximum Potential Emission Rate (lb/hr)	Method**
Fluoropolymer Particulate <sup>6</sup>	0.04	EE
VOC's <sup>4</sup>	0.51	MB,EE
HF (HAP) 7665393	0.013	MB,EE
Regulated Pollutant <sup>5</sup>	0.01	MB,EE

4. CAS# 116-15-4 and 116-14-3

5. CAS# 630080

6. CAS# 25067-11-2, or Component Tefzel , or Component PFA

\* exhaust point of header system

\*\* MB – material balance: EE – Engineering Estimate: TM – Test Measurement (submit test data): 0 – other (Explain)

## 10. The following pertains to equipment that burns fuel (heaters, dryers, etc.):

■ Check here if not applicable

- (a) Type of fuel and maximum fuel burn rate, per hour:

---

- (b) Provide maximum percent sulfur and ash content of fuel and the fuel BTU content using appropriate units:

\_\_\_\_\_ %S      \_\_\_\_\_ % Ash      \_\_\_\_\_ BTU/lb, SCFD, gal  
(circle one)

- (c) Theoretical combustion air requirement in SCFD per unit of fuel (circle appropriate unit) @ 70°F and 14.7 PSIA:

\_\_\_\_\_ SCFD/lb, SCFD, gal (circle one)

- (d) Percent excess air: \_\_\_\_\_ %

- (e) Type, number and BTU rating of burners and all other firing equipment that are planned to be used:

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- (f) Maximum design heat input: \_\_\_\_\_ x10<sup>6</sup> BTU/hr

**NOTE:** An *AIR POLLUTION CONTROL DEVICE SHEET* must be completed for any air pollution device(s) (except emergency relief devices) used to control emissions from this equipment item.

## Attachment M – Air Pollution Control Device Sheets



## AIR POLLUTION CONTROL DEVICE SHEET (WET COLLECTING SYSTEM)

Identification Number\*: C1GZC

Answer the following for each wet collector in the system.

1. Manufacturer's name and model identification:  
DuPont Design
2. Proposed type of scrubber (e.g., spray tower, Venturi, packed bed, etc.):  
Spray Tower
3. Estimated gas pressure drop at maximum flow rate: 3 inches H<sub>2</sub>O.
4. Gas flow rate into collector: 10 ACFM @ 200 °F and 15 PSIA.
5. Give proposed gas velocity through throat of venturi scrubbers, if applicable:  
N/A ft/sec.
6. Type of pollutant(s) to be collected (if particulate give specific type):  
VOC, HAP, Regulated Pollutant, Particulate (Fluoropolymer - PFA)
7. Scrubber Liquor Composition: Process Water
8. Scrubbing liquor losses (evaporation, etc.): N/A gal/1000 ACF gas
9. Source of liquor (explain): Plant process water supply system
10. Liquor flow rates to scrubber: 0.03 gal/min
11. Liquor pressure to scrubber: 25 PSIA
12. Describe system to be used to supply liquor to collector:  
Ducts directly connect scrubber to exhaust blower suction header

\* The identification number which appears here must correspond to the air pollution control device identification number appearing on the *List Form*.

13. Give the expected solids content of the liquor:  
0.1 Wt%
14. If the liquor is to be recirculated, describe any treatment performed:  
N/A
15. Scrubber construction material: FRP
16. Provide a scale drawing of the scrubber showing internal construction. Please include packing type and size, spray configurations, baffle plates, and mist eliminators.
17. What type of liquid entrainment eliminators or system will be used? Submit a schematic diagram showing thickness, mesh, and material of construction.  
  
None
18. What will be the power requirements of the collector?  
  
Vacuum pump hp: 5 hp
19. What type of fan(s) will be used: Lobe type vacuum pump  
  
Type of fan blade:N/A Diameter of blades:N/A in.  
  
Number of blades:N/A  
  
Also supply a fan curve for each fan to be used.
20. Supply an equilibrium curve and/or solubility data (at various temperatures) for the proposed system.
21. Guaranteed minimum collection efficiency (specify for each pollutant to be captured):  
  
(Fluoropolymer) Particulate 85%.
22. Supply a curve showing proposed collection efficiency versus gas volume from 25 to 100 percent of design rating of collector.

## 23. Emission rate of pollutant (specify) into and out of collector:

Pollutant: VOC,HAP,Reg.Pol. In: 0.533 \_\_\_lb/hr; \_\_\_ 6.22 grains/ACF

Out: 0.52 \_\_\_lb/hr; \_\_\_ 6.07 grains/ACF

Pollutant: Particulate (PFA) In: 0.04 \_\_\_lb/hr; \_\_\_0.467 grains/ACF

Out: .006 \_\_\_lb/hr; \_\_\_0.070 grains/ACF

## 24. By what method were the uncontrolled emissions calculated?

☒ Material Balance☐ Stack Test☐ Pilot Test☐ Other (specify) \_\_\_\_\_

## 25. Complete the following tables:

Particle Size Distribution at Inlet to Collector

Particle Size Range (µm)	Weight % for Size Range
0-2	34.4
2-4	5.5
4-6	2.7
6-8	2
8-10	3.4
10-12	6.9
12-16	4.7
16-20	5.6
20-30	11.8
30-40	4.9
40-50	4.2
50-60	6.9
60-70	7.0
70-80	0
80-90	0
90-100	0
>100	0

Fractional Efficiency of Collector

Particle Size Range (µm)	Weight % for Size Range
0-2	60%
2-4	85%
4-6	87%
6-8	93%
8-10	99%
10-12	99.99%
12-16	99.99%
16-20	99.99%
20-30	99.99%
30-40	99.99%
40-50	99.99%
50-60	99.99%
60-70	99.99%
70-80	99.99%
80-90	99.99%
90-100	99.99%
>100	99.99%

## 26. The following questions pertain to the system exhausting the affected source(s) to this control device:

- a. Provide a written description of the pollutant capture system (e.g., hooding arrangement). State hood face velocity and hood collection efficiency, if applicable:

Pollutants are directly piped to scrubber

b. Provide a scale drawing of projected pollutant transport system including duct arrangement, size of ducts, air volume, capacity and projected operating horsepower of air movers such as fan(s) and/or compressor(s). (This information can be supplied on the diagram requested in Section III).

c. Describe any air pollution control device inlet and outlet gas conditioning processes (e.g., gas cooling, gas reheat, gas humidification):

None

d. Describe collected material disposal system:

Collected material is recycled for re-use

e. Complete the Emission Points Data Sheet.

## Supporting Emission Calculations

## Example Calculations

### 1. Ideal gas law – $P*V=n*R*T$ , solve for n.

P= pressure

V= volume

n= no. of moles

R= universal gas constant

T= temperature

a.  $n*mwt$ = pounds emitted per event with event duration no greater than 1 hour

mwt= molecular weight of the compound(s) emitted.

b.  $n*\text{percentage of component}*mwt$ =pounds emitter per event when dealing with less than 100%

c. Number of events determine annual emissions

Number of batches.

Number of yearly cleanings or outages

### 2. For non-ideal situations – equation of state – used to determine mole fractions

$$P=R*T/(V-b)-a/(V*(V+b)+b*(V-b))$$

P=pressure

V= molar volume

T= temperature

a is a function of interaction parameters and mole fractions

b is a function of component critical temperatures and pressures.

a. solve for pounds per event as before

b. same as in 1.b.

### 3. Air measurements to determine pounds per event then times number of events to get annual emissions.

### 4. Polymer rate times emissions per pound of polymer

a. polymer rate may have a surrogate such as motor amps, screw speed, etc. for hourly emissions or number of batches for annual emissions.

b. emissions per pound of polymer are either engineering estimates, determined by off gas analysis, scaling up from a pilot plant or simple stack measurements.

The values presented in the detailed calculation pages were derived from a combination of engineering calculation software (TK Solver) based on the  $PV=nRT$  equation and analytical measurements therefore they differ from the following example due to varying software input values and the addition of the E1 compound generated from the FRD 903/902.

## Reactors (X1, X2)

### Description

Polymerization takes place at high temperature and pressure in an aqueous medium. After polymerization is complete, unreacted materials are recycled to the monomer production area for re-use. After the initial vent to recycle or the thermal converter, the reactors contain residual unreacted gas that is vented to atmosphere prior to processing the next batch.

The vent to atmosphere is accomplished by applying vacuum to the reactor head space to reach a nominal pressure of 5.2 psia (-9.5 psig vacuum). Next, the atmospheric vent is closed and N<sub>2</sub> is added to reach ambient pressure. Then the aqueous batch is dropped into a decanter. N<sub>2</sub> is left on during this transfer process, so the net result is that the residual gas in the reactor head space is drawn into the next vessel downstream of the reactor and emitted from this vessel.

For emission determination and allocation, the total amount that is emitted from both the reactor and the next vessel downstream is calculated based on the total amount of gas in the reactor after recycle to monomers (or to thermal converter), and then this total is allocated to reactor vent and decanter (or stabilization tank) vent based on the vacuum pressure setting.

### Emission Calculations

Emissions from the reactor and associated vessel (decanter or stabilization tank) depend upon the amount and composition of the gas remaining in the reactor head space after venting to the monomers area (or thermal converter), and the head space temperature and pressure.

There are several combinations of cases that must be evaluated in order to determine the maximum potential emissions from these vessels. There are four basic types of polymers made in the reactors; one using only TFE, two others with small amounts of comonomers, and a copolymer (PFA). Each product within the four basic types was evaluated with respect to aqueous phase volume, and the worst case (i.e. highest reactor head space volume) product was used as the basis for emission calculations. Each of the four product types were evaluated for both a pure monomer case and a maximum impurity case. Pure monomer is the worst case for potential VOC emissions, and maximum impurities is the worst case for ODCs and HAPs. Only certain product recipes utilize the FRD903/902 compounds.

A small fraction of batches must be aborted after the initial pressure up phase. Because the aqueous phase is smaller for an aborted batch than for a normal batch, this case becomes the worst case for maximum hourly potential emissions. However, because batches are aborted infrequently, the effect on annual potential emissions is minimal. Pure monomer is the worst case for an aborted batch because the total amount of impurities introduced into the reactor is less for an aborted batch than a batch which is reacted to completion.

### TFE Homopolymer Example

TFE homopolymers are made with either all TFE monomer or with small amounts of additives. The worst case product with respect to VOC emissions will be used in the following examples with both pure TFE monomer and maximum impurities in the TFE monomer feed.

## A. Pure TFE Monomer

Reaction takes place at a pressure of 365 psia and temperature of 80 C (176 F). Reactor head space is calculated by subtracting the raw dispersion volume from the reactor total volume (810 gal). For the worst case TFE homopolymer, the reactor head space is 30.482 ft<sup>3</sup>.

The first step is to calculate the total number of moles of gas present in the reactor after the reaction is complete. This is done as follows using the Perfect Gas Law with the known T, P, and V after the reaction:

$$\begin{aligned} n &= PV/RT \\ n &= (365)(144)(30.482)/(1545)(460+176) \\ n &= 1.6305 \text{ lb moles} \end{aligned}$$

The calculation above holds for both the pure monomer case and the monomer impurity case. Next, the composition of the gas must be calculated in order to determine the emissions to atmosphere. The composition of the gas depends upon the amount of monomer feed to the reactor, the amount of impurities in the monomer feed streams, the amount of each material reacted, and water vapor pressure. For the pure monomer case, feed rate to the reactor is:

$$\begin{aligned} \text{Mass feed TFE} &= m_{\text{TFE}} = 3090 \text{ lb/batch} \\ \text{Molar feed TFE} &= n_{\text{TFE}} = 3090/100 = 30.90 \text{ lb moles/batch} \end{aligned}$$

For pure TFE monomer, the only other component in the head space is water vapor. The amount of water vapor after reaction is estimated from the perfect gas law:

$$\begin{aligned} n_{\text{water}} &= P_{\text{water}}V/RT \\ n_{\text{water}} &= (6.87)(144)(30.482)/(1545)(460+176) \\ n_{\text{water}} &= 0.03069 \text{ lb moles} \end{aligned}$$

The amount of TFE in the reactor head space after the reaction is determined by subtracting the moles of water vapor from the total moles in the reactor head space before venting to monomers area:

$$n_{\text{TFE}} = 1.6305 - 0.0307 = 1.5998 \text{ lb moles}$$

Emissions to the atmosphere are calculated using the perfect gas law and assuming that water vapor is not replenished during the recycle of unreacted TFE from the reactor to the monomer area. Mole fractions after reaction are:

$$\begin{aligned} Y_{\text{TFE}} &= 1.5998/1.6305 = 0.9812 \\ Y_{\text{H}_2\text{O}} &= 0.0307/1.6305 = 0.0188 \end{aligned}$$

If water vapor is not replenished, then the mole fractions remain constant during the pressure reduction from 365 psia to 16.7 psia. TFE emissions to the atmosphere are:

$$\begin{aligned} n_{\text{TFE}} &= (16.7)(0.9812)(144)(30.482)/[(1545)(460+176)] \\ n_{\text{TFE}} &= 0.0732 \text{ lb mole} \end{aligned}$$

Since the molecular weight of TFE is 100, the amount of TFE (VOC) emitted per batch is 7.32 lb. However, since the reactor pressure is only reduced to 5.2 psia during the vacuum step,



some of the TFE remains in the reactor head space and is assumed to be drawn into the decanter when the raw aqueous dispersion is dropped from the reactor into the decanter.

Total TFE emissions of 7.32 lb/batch are allocated to the reactor and decanter as follows:

$$\text{Reactor emission} = 7.32[(16.7-5.2)/16.7] = 5.04 \text{ lb/batch}$$

$$\text{Decanter emission} = 7.32(5.2/16.7) = 2.28 \text{ lb/batch}$$

Total VOC emissions for this case are 6.26 lb/batch (lb/hr); this is allocated to the reactor and decanter the same way as for the pure TFE monomer case (4.31 lb for the reactor and 1.95 lb for the decanter). Maximum ODC emissions are 0.36 lb from the reactor and 0.16 lb from the decanter. There are no HAP impurities in TFE.

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## Attachment O

### Monitoring, Recordkeeping, Reporting and Testing Plans

**Attachment O – Monitoring, Recordkeeping, Reporting and Testing Plan  
R13-2365F Class II Permit Amendment Application**

**Monitoring**

- Under section 4.2.2. of Title V Operating Air Permit R30-10700001-2010 (Part 2 of 14), the permittee will continue to monitor:
  - Water flow to the vacuum pump; this must remain at or above two (2) gallons per minute or the oven heaters will be turned off.

**Recordkeeping**

- In accordance with section 4.4.2. of the Title V permit, the permittee will continue to keep accurate records of maintenance activities and malfunctions and other operational shutdowns which result in excess emissions; the minimum required additional information identified in this section shall be recorded.
- In accordance with section 4.4.4. of the Title V permit, the permittee will continue to keep records of any malfunctions lasting in excess of 30 minutes

**Reporting**

- None.

**Testing**

- None.

## Attachment P

### Public Notice

## Attachment P – Public Notice

### **AIR QUALITY PERMIT NOTICE Notice of Application**

Notice is given that The Chemours Company FC, LLC, has applied to the West Virginia Department of Environmental Protection, Division of Air Quality, for a Class II Administrative Update for a plastic polymerization facility located on 8480 DuPont Road near Parkersburg in Wood County, West Virginia. The coordinates are: Latitude 39.270112 and Longitude - 81.674208.

The applicant estimates the increased potential to discharge the following Regulated Air Pollutants: Volatile Organic Compounds (VOCs): 1.02 tons/year; Acetonitrile: 0.01 tons/year; Carbon Monoxide: 0.01 tons/year.

No physical changes to the existing operations are planned. Written comments will be received by the West Virginia Department of Environmental Protection, Division of Air Quality, 601 57<sup>th</sup> Street, SE, Charleston, WV 25304, for at least 30 calendar days from the date of publication of this notice.

Any questions regarding this permit application should be directed to the DAQ at (304) 926-0499, extension 1227, during normal business hours.

Dated this the **30** day of April, 2015.

By: The Chemours Company FC, LLC  
Robert J. Fehrenbacher  
Plant Manager  
8480 DuPont Road  
Washington, WV 26181-1217

## Attachment S

### Title V Permit Revision Information

Attachment S  
Title V Permit Revision Information

## 1. New Applicable Requirements Summary

Mark all applicable requirements associated with the changes involved with this permit revision.

<input type="checkbox"/> SIP	<input type="checkbox"/> FIP
<input checked="" type="checkbox"/> Minor source NSR (45CSR13)	<input type="checkbox"/> PSD (45CSR14)
<input type="checkbox"/> NESHAP (45CSR15)	<input type="checkbox"/> Nonattainment NSR (45CSR19)
<input type="checkbox"/> Section 111 NSPS (Subpart ____)	<input type="checkbox"/> Section 112(d) MACT standards
<input type="checkbox"/> Section 112(g) Case-by-case MACT	<input type="checkbox"/> 112(r) RMP
<input type="checkbox"/> Section 112(i) Early reduction of HAP	<input type="checkbox"/> Consumer/commercial prod. reqts., section 183(e)
<input type="checkbox"/> Section 129 Standards/Reqts.	<input type="checkbox"/> Stratospheric ozone (Title VI)
<input type="checkbox"/> Tank vessel reqt., section 183(f)	<input type="checkbox"/> Emissions cap 45CSR§30-2.6.1
<input type="checkbox"/> NAAQS, increments or visibility (temp. sources)	<input type="checkbox"/> 45CSR27 State enforceable only rule
<input type="checkbox"/> 45CSR4 State enforceable only rule	<input type="checkbox"/> Acid Rain (Title IV, 45CSR33)
<input type="checkbox"/> Emissions Trading and Banking (45CSR28)	<input type="checkbox"/> <input type="checkbox"/> Compliance Assurance Monitoring (40CFR64) <sup>(1)</sup>
<input type="checkbox"/> NO <sub>x</sub> Budget Trading Program Non-EGUs (45CSR1)	<input type="checkbox"/> NO <sub>x</sub> Budget Trading Program EGUs (45CSR26)

<sup>(1)</sup> If this box is checked, please include **Compliance Assurance Monitoring (CAM) Form(s)\*** for each Pollutants Specific Emission Unit (PSEU).

## 2. Non Applicability Determinations

List all requirements, which the source has determined to be not applicable to this permit revision and for which a permit shield is requested. The listing shall also include the rule citation and the rationale for the determination.

The proposed changes do not trigger any new applicable requirements nor do they invalidate any previous non-applicability determinations.

☐ Permit Shield is Requested *(not applicable to Minor Modifications)*

<b>3. Change in Potential Emissions</b>		
<b>Pollutant</b>	<b>Change in Potential Emissions (+ or -), lb/hr</b>	<b>Change in Potential Emissions (+ or -), TPY</b>
VOC	Total increase of 6.16 from two sources	1.02
Acetonitrile	<0.01	<0.01
Hydrofluoric Acid	Trace	Trace
CO	0.01	0.01

<b>4. List other Active NSR Permits / Permit Determinations / Consent Orders associated with this permit revision (if any):</b>		
<b>NSR Permit and/or Consent Order Number</b>	<b>Date of Issuance</b>	<b>NSR Permit / Consent Order Condition Number</b>
R13-2365E	8/5/2013	Tables A.1., B.3.(a) and B.3.(b)
R30-10700182-2010	12/8/2014	Tables 4.1.1., 4.2.2.a and 4.2.2.b
<b>5. Inactive Permits / Obsolete Permit or Obsolete Consent Order(s) Conditions Associated With This Permit Revision</b>		
<b>NSR Permit and/or Consent Order Number</b>	<b>Date of Issuance</b>	<b>NSR Permit / Consent Order Condition Number</b>

<p><b>6. Suggested Title V Draft Permit Language</b></p> <p>Are there any changes involved with this Title V Permit revision outside of the scope of the NSR Permit revision? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p> <p>If Yes, describe the changes below. Also, please provide suggested Title V Draft Permit language for these changes (including all applicable requirements and any monitoring /recordkeeping/ reporting requirements associated with the changes), or attach a marked up pages of current Title V Permit. Please include appropriate citations for those requirements being added / revised.</p> <p>Proposed language for control device C1GZC may be found in Table 4.2.4. of R13-1953H; all other changes are emission limit changes as described within the attached administrative amendment application.</p> <p>See the table below for associated permit condition changes based on the attached R13-2365 update.</p>
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**7. Certification For Use Of Minor Modification Procedures (for Minor Modifications only)****Note:**

*This certification must be signed by a responsible official. Minor Modification applications without a signed certification will be returned as incomplete. The criteria for allowing the use of Minor Modification Procedures are as follows:*

- i. Proposed changes do not violate any applicable requirement;
- ii. Proposed changes do not involve significant changes to existing monitoring, reporting, or recordkeeping requirements in the permit;
- iii. Proposed changes do not require or change a case-by-case determination of an emission limitation or other standard, or a source-specific determination for temporary sources of ambient air quality impacts, or a visibility increment analysis;
- iv. Proposed changes do not seek to establish or change a permit term or condition for which there is no underlying applicable requirement and which permit or condition has been used to avoid an applicable requirement to which the source would otherwise be subject (synthetic minor). Such terms and conditions include, but are not limited to a federally enforceable emissions cap used to avoid classification as a modification under any provision of Title I or any alternative emissions limit approved pursuant to regulations promulgated under § 112(j)(5) of the Clean Air Act;
- v. Proposed changes do not involve preconstruction review under Title I of the Clean Air Act or 45CSR14 and 45CSR19;
- vi. Proposed changes are not required under any rule of the Director to be processed as a significant modification;

Notwithstanding subparagraph 6.5.a.1.A. of 45CSR30 (items i through vi above), minor permit modification procedures may be used for permit modifications involving the use of economic incentives, marketable permits, emissions trading, and other similar approaches, to the extent that such minor permit modification procedures are explicitly provided for in rules of the Director which are approved by the U.S. EPA as a part of the State Implementation Plan under the Clean Air Act, or which may be otherwise provided for in the Title V operating permit issued under this rule.

Pursuant to Section 6.5.a.2.C of 45CSR30, the proposed modification contained herein meets the criteria for use of Minor permit modification procedures as set forth in Section 6.5.a.1. The use of Minor permit modification procedures are hereby requested for processing of this application.

(Signed):



(Please use blue ink)

Date:

May / 7 / 2015

(Please use blue ink)

Named

(typed):

Robert J. Fehrenbacher

Title:

Plant Manager

**NOTE:**

*(1) For Administrative Amendments, the ability to operate with the changes described in this permit application is granted upon submittal of the application.*

*(2) For Minor Modifications, the ability to operate with the changes described in this permit application is granted after seven (7) days from the submittal of the application, or upon issuance of the NSR permit, whichever is later.*

*(3) For Significant Modifications, the ability to operate is granted upon issuance of the modified Title V permit.*

\* All of the required forms and additional information can be found and downloaded from DAQ's Permitting Section site [www.wvdep.org/daq](http://www.wvdep.org/daq), requested by phone (304) 926-0475, and/or obtained through the mail.

**7. Certification For Use Of Minor Modification Procedures** *(for Minor Modifications only)*

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**Pursuant to Section 6.5.a.2.C of 45CSR30, the proposed modification contained herein meets the criteria for use of Minor permit modification procedures as set forth in Section 6.5.a.1. The use of Minor permit modification procedures are hereby requested for processing of this application.**

(Signed):	_____	Date:	____ / ____ / ____
	<i>(Please use blue ink)</i>		<i>(Please use blue ink)</i>
Named (typed):	Robert J. Fehrenbacher	Title:	Plant Manager

**NOTE:**

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