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Conservation

Per & Polyfluoroalkyl Substance (PFAS) Emission Test Results – McCaffrey Street PFAS Emissions Characterization Study

New York State Department of Environmental Conservation, Division of Air Resources
United States Environmental Protection Agency, Office of Research and Development,
Center for Environmental Measurements and Modeling.

Hoosick Area Community Participation Work Group
December 18, 2019

Study Objectives

- Primary Objective - **Qualitative** characterization of PFAS emissions and polytetrafluoroethylene (PTFE) decomposition products from an industrial PTFE sintering oven as a function of sintering time.
- Secondary Objective - Evaluation of on-line, real-time chemical ionization mass spectrometry (CIMS) as a potential process monitor for temporal process emissions characterization. **First time field use of this powerful analytical tool.**
- Goal – Comprehensive **qualitative** characterization of target and non-target PFAS, PTFE decomposition products and volatile organic compound (VOC) emissions from this specific process operation.



Overall Conclusion

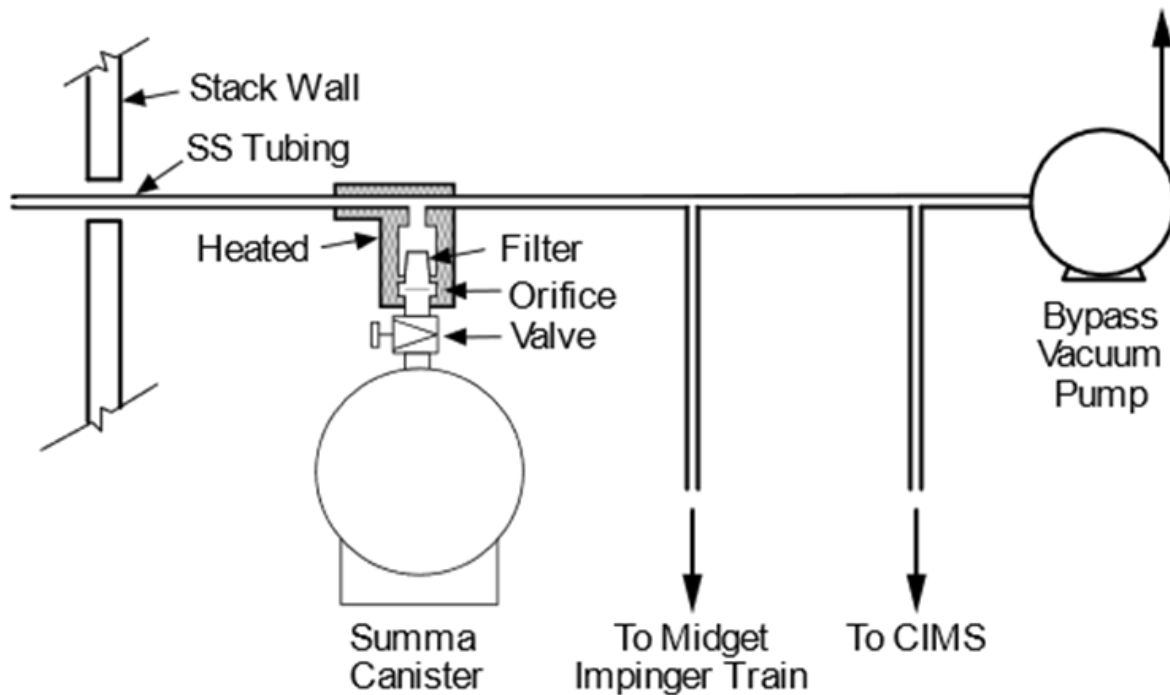
Overall results indicate extremely low emissions from PTFE sintering oven process operations at the facility.

The qualitative study identified trace emissions of

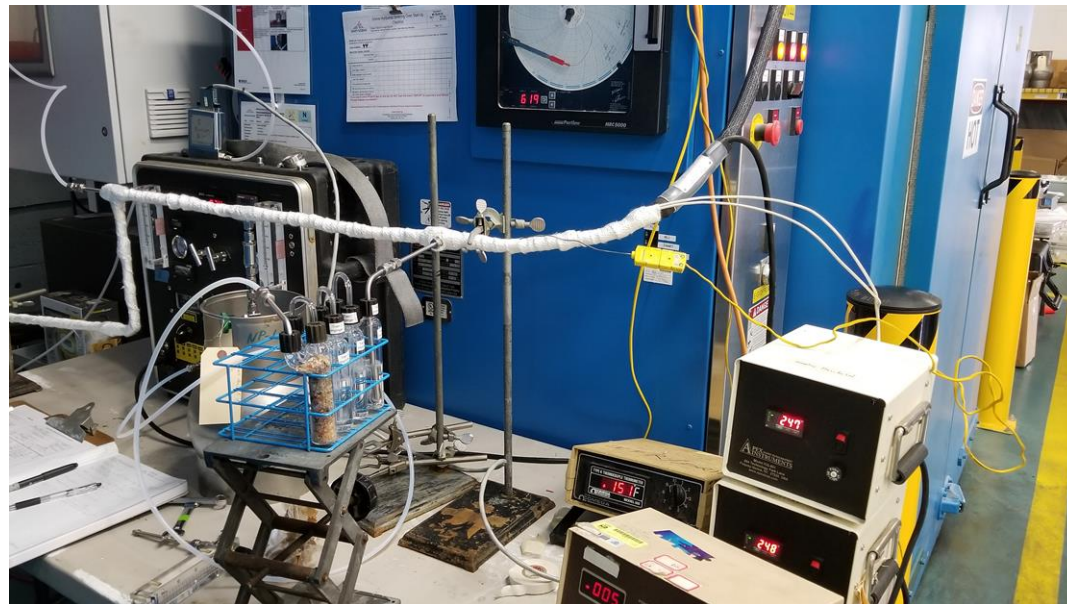
- emerging ultra low chain perfluoralkyl substance replacements,
- a fluorotelomer alcohol,
- an expected PTFE decomposition product and some polyfluoroalkyl substances which are not believed to be associated with the process operations at the facility.



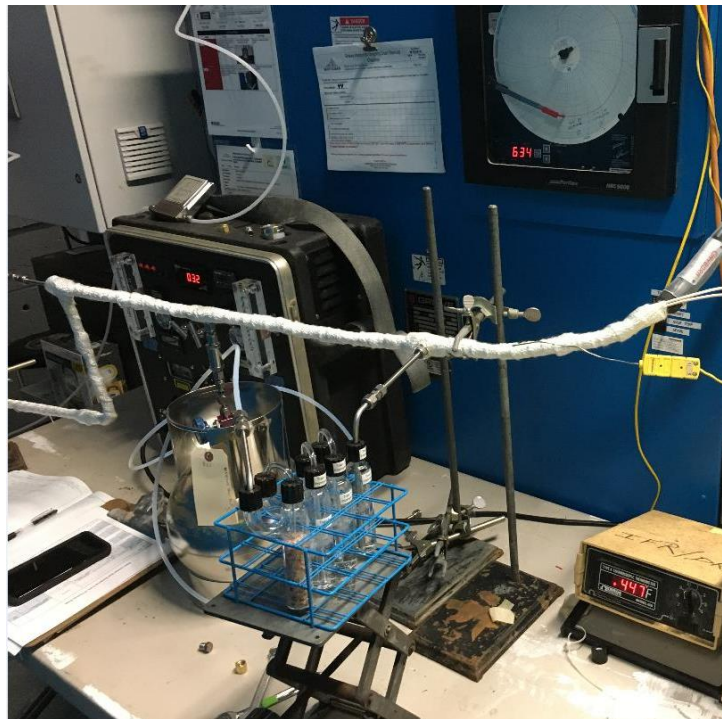
Study Overview



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CIMS Results

- Real-time monitor detected the slow release of three perfluorinated carboxylic acids (PFCAs) over time as the sintering temperature increased.
- Perfluoroethanoic acid (C2), Perfluoropropanoic acid (C3) and Perfluorobutanoic acid (C4). Two ultra-short and one short chain replacements.
- EPA noted the relative responses should not be interpreted as concentrations relative to each other since the absolute CIMS response varies among individual compounds.
- This technique offers high-time resolution measurement capability with part per trillion (ppt) by volume (nanograms per cubic meter) gas phase detection limits.
- Did not detect any PFCAs above C4 (No PFOA – C8 or other longer chain perfluorinated substances).



CIMS Results

NYSDEC PTFE Sintering Study

December 2, 2019

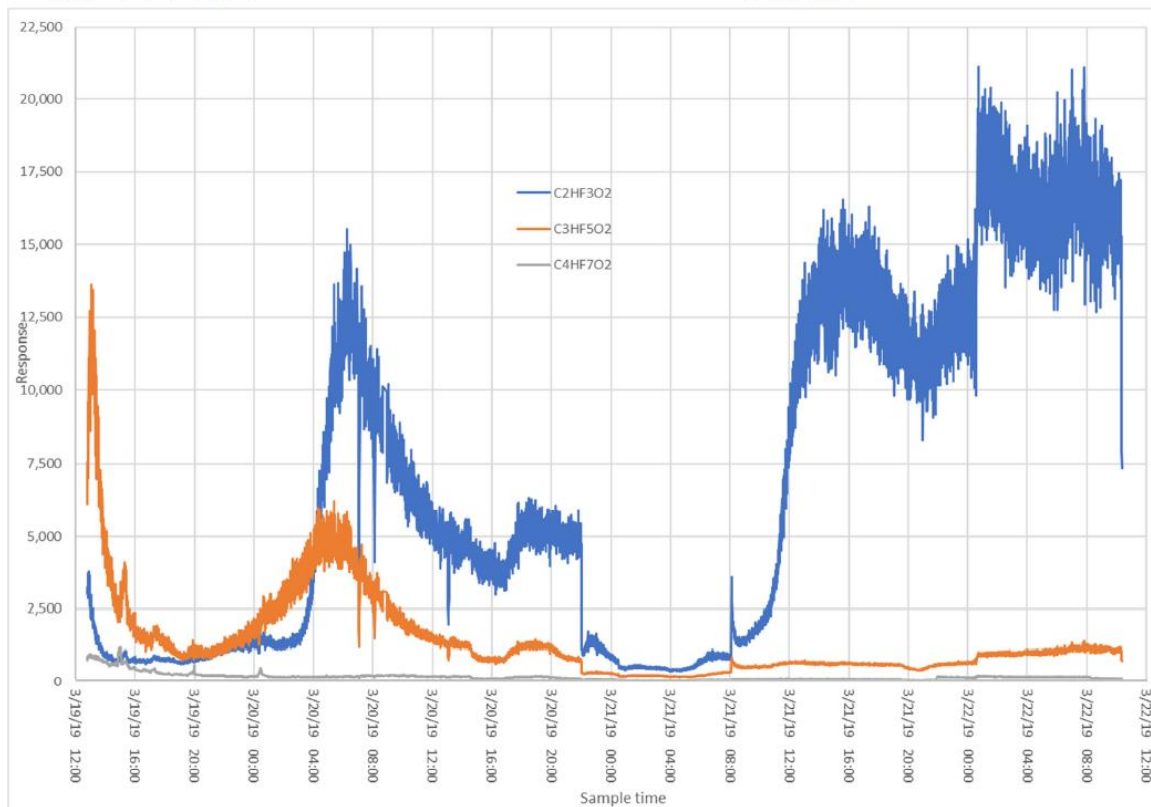


Figure 2. Graphically Depicted CIMS Results



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Midget Impinger Train Results

- Compound is considered detected if it is greater or equal to 10 times the nitrogen system blank level.
- Only 15 non-targeted polyfluorinated compounds were tentatively identified.
- Tentative identification of 2 were diagnostically matched against the U.S. EPA CompTox Chemical Dashboard.
- Actual PFAS identities of the others could not be established, but the molecular mass and formula can be. Tentative identification – Polyfluorinated Methyl Esters and Di-Acids.
- They were only detected in sample 1 of the 16 samples taken, which indicates they were emitted very early in the oven heating cycle.
- ORD has indicated PFOA was conclusively not present in the emissions. No other legacy PFAS Method 537 compounds were detected in any of the 16 samples.



SUMMA Canister Results – PFAS/PTFE Decomposition Products

- SUMMA Canisters detected one PTFE decomposition product (tetrafluoroethylene - TFE) and one fluorotelomer alcohol (4:2 fluorotelomer alcohol).
- Known PTFE decomposition products - hexafluoropropylene (HFP) and perfluoroisobutylene (PFIB) were not detected.
- Higher molecular weight fluorotelomer alcohols (6:2 and 8:2 FTOH) were not detected.
- Evolution of TFE increased as sintering temperature increased (expected).
- 4:2 FTOH was also slowly released as temperature increased until it was not detected.



SUMMA Canister Results – VOCs

- Overall the results were unremarkable as expected. The ovens are electric so there is no use of fossil fuels which would result in higher VOC detections.
- One indoor ambient 2 hour sample was taken on the floor at the conclusion of the emissions testing. VOCs used at the facility were detected.



Next Steps - DEC

- Evaluate the use of this information in reviewing the results from the current on-going remedial investigations. Regional Air Deposition Study Work Plan for the Village of Hoosick Falls. (August 2019).
- Request ORD to estimate TFE and VOC concentrations in the SUMMA emission samples where possible.
- Continue to evaluate the source of the polyfluorinated substances observed in the midget impinger samples through the available literature.



Questions

Thank You

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