Responses to DEQ Requests Regarding Exhibit 11

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ERM provides the following responses to the DEQ's Additional Technical Information Requests that pertain to the ERM report provided in Chemours's April 27, 2018 submission as Exhibit 11 ("Modeling Report: HFPO-DA Atmospheric Deposition and Screening Groundwater Effects"). The DEQ requests are listed in bold black text, followed by ERM's responses in blue text.

Additional technical information or clarification required from the April 27, 2018 Chemours response Exhibit 11— Modeling Report: HFPO-DA Atmospheric Deposition and Screening Groundwater Effects

DAQ requests that Chemours and their contractor submit the electronic modeling files to the DAQ Air Quality Analysis Branch in order to conduct a thorough review, verify assumptions and model inputs.

ERM will provide the requested electronic modeling files.

Modeling a batch process using an annual average emission rate introduces a high level of uncertainty. When the desired output is an annual average air concentration, as has been the historic use of AERMOD, this uncertainty is less. EPA's guidance for modeling under the DRR for the one-hour SO2 standard required that actual hourly emissions were used. Modeling for wet deposition is similar to modeling for a one-hour standard in that the pairing of actual emissions with the period of precipitation is important in a refined modeling analysis. Please explain why hourly batch emissions were not modeled to determine concentrations and deposition.

The desired output for the analysis is long term deposition amounts. Therefore, the use of annual average emission rates in this analysis is an appropriate assumption. Additionally, the deposition modeling of the particulate emissions indicate that dry deposition (i.e., settling) is the dominant deposition pathway, therefore the episodic nature of rainfall events coinciding with batch process emissions is not an uncertainty that would substantially affect the results of the analysis.

Our experience in modeling for deposition over an area such as a watershed, waterbody, or land area for estimating resulting concentrations in water or soil involve the use of evenly spaced receptors over the area of interest. How does the use of nested grids of receptors with different spacing impact the groundwater modeling? Can more information be provided about the interface between the atmospheric and groundwater modeling efforts?

The derived groundwater concentrations presented in Table 1 of the Exhibit 11 report are based on the modeling of discrete receptors at well locations. The illustrative plots presented in Appendices F and G are based on the nested grid of receptors. Changing the nested grid of receptors to a fixed grid spacing would not substantially affect the modeling results presented in Appendices F and G, and would have no effect on the modeling of the discrete well locations since these runs did not use the nested grid of receptors.

How was the five-year period of meteorological data used to arrive at an estimate of "average annual total deposition?" It is standard practice in both PSD modeling for EPA and in modeling for toxic air pollutants in NC to use the highest results for the time period of interest over the five years modeled.

The desired output of the modeling analysis is to characterize long term deposition amounts. The annual averages were determined for each receptor, and the five year period average was calculated in the post-processing of the annual model results. The air quality modeling files reviewed by ERM that were provided by NCDEQ also used a five year period average, rather than a maximum annual average over the five year modeled period. A five year period is appropriate to characterize long term chronic exposure.

Appendix C -Table C-1 Emissions of HFPO-DA - Annual Emission Rates, the October 2018 Case table needs to be corrected.

A corrected Table C-1 is attached. The typographical errors in the October 2018 Case table and the notes have been corrected. We have not changed any of the emissions figures used in the modeling.

In Table C-2 Modeled Stack and Fugitive Physical Source Parameters, a range of temperatures in degrees Kelvin are presented. Please provide justification for the effluent temperatures.

The modeled stack exhaust temperatures were based on the stack exhaust temperatures that were measured during the stack tests. It should be noted that the fugitive emissions were modeled as volume sources, which do not require a temperature to be entered into AERMOD.

Table C-1 – Emissions of HFPO-DA – Annual Emission Rates

2017 Base Case

Source	Process Vent (lbs)	Indoor Equipt (lbs)	Outdoor Equipt (lbs)
VE_North	1506.4	2.5	1.7
VE_South	114	1.6	0.4
PPA	638.8	31.2	1
Polymers	4.8	0	0
Semi-works	0.15	0.05	0

Assumptions (all cases):

1 - Process Vent for VE-North, VE-South, PPA are scrubber emissions
2 - Indoor Equipment is vented to the stack but post-scrubber emissions
3 - Outdoor Equipment represents fugitve emissions, modeled as volume source in AERMOD

October 2018 Case

Source	Process Vent (lbs)	Indoor Equipt (lbs)	Outdoor Equipt (lbs)
VE_North	602.56	0.25	1.7
VE_South	7.4	0.1	0.4
PPA	19.164	0.936	1
Polymers	4.8	0	0
Semi-works	0.15	0.05	0

October 2018 Case Assumptions:

1 - Additional 60% Control Efficiency to VE-North scrubber
2 - No PPVE campaign from VE-South

May 31 2018 Case

Source	Process Vent (lbs)	Indoor Equipt (lbs)	Outdoor Equipt (lbs)
VE_North	1355.76	0.25	1.7
VE_South	7.4	0.1	0.4
PPA	19.164	0.936	1
Polymers	4.8	0	0
Semi-works	0.15	0.05	0

May 31 2018 Case Assumptions:

1 - Additional 10% Control Efficiency to VE-North scrubber
2 - VE-North Indoor Equipment controled by carbon adsorber
3 - No PPVE campaign from VE-South
4 - PPA Process Vent and PPA Indoor Equipment controled by carbon adsorber

2019/2020 Case

	Process Vent (lbs)	Indoor Equipt (lbs)	Outdoor Equipt (lbs)
VE_North	1.5064	0.25	1.7
VE_South	0.114	1.6	0.4
PPA	19.164	0.936	1
Polymers	0.0048	0	0
Semi-works	0.15	0.05	0

2019/2020 Case Assumptions:

1 - 99.99% control of VE-N and VE-S via thermal oxidizer