Major comments

1. **External vs. Internal Mixing and Environmental Relevance**

A key concern is that the mixing state between bacteria and PFAS in the chamber experiments differs fundamentally from the environmental scenario described in the Introduction.

Bacteria and PFAS were aerosolized separately using different generators, resulting in external mixing in the chamber air. In contrast, wastewater treatment plant aeration produces internally mixed aerosols because microorganisms and PFAS are already mixed in the aqueous phase prior to bubble bursting.

Given the low particle concentrations and short residence times in chamber studies, the probability of meaningful interaction between separately generated bacterial aerosols and PFAS droplets in air is very low. Therefore, the reported lack of bacterial influence on PFAS aerosol formation may be a consequence of the experimental design rather than a true absence of interaction.

The authors should more clearly acknowledge this limitation and restrict the scope of their conclusions, or modify the experimental setup to better represent internal mixing conditions relevant to wastewater environments.

2. **Wall loss**

Wall loss is likely to vary as a function of PFAS chain length, yet the manuscript appears to assume that relative comparisons remain valid because all compounds experience wall loss. It is not clear that this assumption is justified. If wall-loss efficiencies differ systematically with chain length, then the observed trends may be influenced, at least in part, by differential losses rather than intrinsic behavior.

Therefore, in sections where chain-length-dependent trends are discussed, this limitation should be explicitly acknowledged and its potential impact on the interpretation of the results should be clearly addressed.

3. **MPPD modeling**

The MPPD modeling results are inherently driven by particle size. According to the manuscript, particle size in this study was strongly influenced by experimental conditions

such as solvent composition and the use of a nebulizer. Given this, it is unclear whether interpreting the modeled deposition results on a compound-specific basis is appropriate.

Moreover, while the authors acknowledge that the experimental setup does not fully represent real environmental conditions, it remains questionable whether predicting the magnitude and regional distribution of respiratory deposition is truly meaningful or environmentally representative. The limitations associated with applying the MPPD model to aerosol size distributions generated under these experimental constraints should therefore be explicitly discussed, and the interpretation of the modeling results should be framed accordingly.

Minor comments

1. Line 85-99

   The current discussion appears to rely heavily on listing information rather than synthesizing it. Reorganizing and more clearly integrating the key points would help condense the content and improve overall readability.

2. Line 127

   Please check the superscripts.

3. Line 170

   Please check whether 109 cells/mL is correct.

4. Line 156 and 174

   Both L/min and lpm are used in the manuscript. It would be preferable to use a single, consistent unit throughout.

5. Figure 1

   For readers who are not familiar with PFAS abbreviations, it may be difficult to infer chain length from compound names alone. You may want to consider reorganizing the

compounds by grouping them into the same classes (e.g., PFCAs, PFSAs) and arranging them in order of chain length within each group to improve clarity and readability.

6. Figures

Please consider expanding the figure caption slightly. At present, the caption mainly describes what is shown in the figure. Adding one sentence that highlights the key takeaway or main message of the figure would help readers better understand its significance.