

Reply

Reply to Berthiaume et al. Comment on “Giacosa et al. Characterization of Annual Air Emissions Reported by Pulp and Paper Mills in Atlantic Canada. *Pollutants* 2022, 2, 135–155”

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Citation: Giacosa, G.; Barnett, C.; Rainham, D.G.; Walker, T.R. Reply to Berthiaume et al. Comment on “Giacosa et al. Characterization of Annual Air Emissions Reported by Pulp and Paper Mills in Atlantic Canada. *Pollutants* 2022, 2, 135–155”. *Pollutants* **2022**, 2, 330–332. <https://doi.org/10.3390/pollutants2030022>

Academic Editor: Ali Elkamel

Received: 8 July 2022

Accepted: 14 July 2022

Published: 26 July 2022

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The comment by Berthiaume et al. [1] on the “Characterization of Annual Air Emissions Reported by Pulp and Paper Mills in Atlantic Canada” paper by Giacosa et al. [2] is appreciated. We feel that Berthiaume et al. [1] did not focus on the main objective of the paper, but instead attempted to discredit our study. Our study did not intend to generate a misunderstanding on the National Pollutant Release Inventory (NPRI), but it was intended to compare annual air emissions from the pulp and paper industry considering all the publicly available tools [2].

Many of the comments by Berthiaume et al. [1] are centered on the inaccuracy of the NPRI description in our paper. However, the paper clearly states that the reporting requirements are mandatory (and not ‘suggested’ as stated by Berthiaume et al. [1], line 13): “ECCC requires that releases above reporting thresholds, shown in Table 1 for the period 2020 to 2021, must be reported to the NPRI program [3]. These thresholds are the lower limit trigger for reporting annual emissions (line 62)” [2]. We also described the NPRI advantages (such as its open access) and disadvantages. In our discussion regarding the NPRI, we focused more on its disadvantages as an inventory, as an academic discourse to provide constructive feedback which can contribute to helping improve those features that undermine the effectiveness of the NPRI. The flaws we identified in Giacosa et al. [2], such as data quality, self-reported releases, and a lack of comprehensiveness, are consistent with the ones described by other researchers [4–8].

Berthiaume et al. [6] highlight that the NPRI “is not enough to make conclusions about exposure or risk, nor is it a direct regulator of emissions” (line 23). As stated in Giacosa et al. [2], we completely agree with this affirmation. Regarding the first part of this statement, we mentioned that the dependence on the intensity and the duration of pollution exposure depends on the local winds, and the mill’s location in comparison to populated centers prevents the NPRI from being used as the only inventory to analyze air pollution exposure [2]. Acknowledging this limitation, we are currently conducting another related study based on comparison and inclusion of different databases to further analyze how local air emissions from industrial sources may affect air quality in local surroundings. Regarding the fact that the NPRI is not a ‘direct regulator of emissions’, we highlighted that the lower reporting thresholds had resulted in limited influence on the adaptive management of facilities’ emissions. However, the fact that the NPRI is not a regulator inventory does not imply the absence of an upper threshold. The NPRI is a tool managed and operated by the Canadian federal government, and it is ultimately the role of the government (either federally or provincially) to regulate industrial emissions and induce reductions (when necessary) [4,5,7].

The aim of our research was to compare annual air releases with existing upper limits to understand how each facility's releases compare with regulation. The lack of an upper limit resulted in the qualitative comparison with the lower reporting threshold. Our intention was not to create confusion or misleading conclusions as Berthiaume et al. [1] suggest, but only to present existing and publicly available data and to understand how the different facilities compare relative to each other. The comparison in tonnes/year was intended to analyze annual releases in the same unit that the NPRI requires to report. This unit only enables to compare exceedances from the lower reporting threshold for the same pollutant, as each pollutant has a different lower reporting threshold [3]. Conversely, the percentage of exceedance was clearly defined in Equation (1) [2] and named as the difference from the reporting threshold (DRT). The aim of the DRT definition was to obtain an additional parameter independent of the pollutant (as each pollutant has a different reporting threshold), to identify the pollutant with the highest exceedances from the reporting threshold.

The comparison with the *Code of Practice for the Management of Air Emissions from Pulp and Paper Facilities* [9] aimed to evaluate how individual facility releases compared to a recommended level when following best practices. This qualitative comparison aimed to assess how each facility's releases have varied (i.e., increased or decreased) relative to the only upper threshold that currently exists (due to the lack of an upper threshold within the NPRI). We apologize for not citing that the document [9] was released in 2018, and that could have led to a misunderstanding by Berthiaume et al. [1]. However, the goal of such comparison was to evaluate how each facility has evolved with regard to emissions according to best practices, independently of when the document was published, as we understand that each facility should aim to work following best practices and accordingly to international guidelines of social and environmental responsibilities, when a national one does not exist.

To summarize, our main objective with our Giacosa et al. [2] paper was to present an updated and long-term comparison of air releases from all the pulp and paper facilities in Atlantic Canada. The NPRI was the secondary data selected as it is publicly available and allowed us to compare the releases of nine air pollutants. The paper identified that there was one pollutant from a specific facility, particulate matter from Northern Pulp, that was several orders of magnitude above other pollutants reported by any of the other mills. This finding is independent of the lower reporting threshold established in the NPRI and the suggested limits of the Code of Practice, and is in line with previous findings [10].

Author Contributions: Conceptualization and methodology, G.G. and T.R.W.; formal analysis, G.G.; writing—original draft preparation, G.G.; writing—review and editing, T.R.W., D.G.R. and C.B.; visualization, G.G.; supervision, T.R.W.; funding acquisition, G.G. All authors have read and agreed to the published version of the manuscript.

Funding: This research was funded through graduate scholarships by Agencia Nacional de Innovación e Investigación (ANII) and by the Canadian Standards Association (CSA).

Data Availability Statement: All primary data can be found on the publicly accessible NPRI website at <https://www.canada.ca/en/services/environment/pollution-waste-management/national-pollutant-release-inventory.html> (accessed on 13 June 2022) and on the publicly accessible APEI website at <https://data-donnees.ec.gc.ca/data/substances/monitor/canada-s-air-pollutant-emissions-inventory/> (accessed on 13 June 2022).

Conflicts of Interest: The authors declare no conflict of interest.

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