

From: [REDACTED]
To: [REDACTED]
Cc: [REDACTED]
Subject: [REDACTED]
Date: 03 December 2020 13:09:50

Dear [REDACTED] and [REDACTED]

Thank you for being patient while we have reviewed the model and composed a response. Regarding the emission module and estimates I believe you had two questions

1. In the Source-flow emission model in "Table E.15 - Estimate of total PFAS emissions from fire-fighting foams" you mention a calculated 26% emissions of PFAS from the foam in the environment (with 13% and 39% as alternative estimates). I understand this is the outcome of the model and assumptions you used and described in Annex B.9 and that the calculations take into account the spread of foam among the different sectors of use (oil/petrochemical, maritime, etc.), percentage of type of use (live incidents, training, etc.) and distribution of emissions among the different environmental compartments based on phys-chem properties, is this right?
2. Is it possible to get the underlying calculations/Excel sheet to reach these numbers? We are considering using these emission rates to estimate emission reductions under the restriction scenario 2 with different review periods for the different sectors of use. Do you think it makes sense to use this sector-averaged emission percentage to make these simulations? Alternatively, do you have sector-specific emission percentages that we could use? Any advice on this would be appreciated.

1.The calculations in the model take a life-cycle approach to quantifying emissions during the manufacture use and waste-cycle with the point of manufacture and sale (assumed to occur in the same year) as the starting point. The study used market data along with literature values for emission factors and physical data to assess the emissions for 12 chemical species of non-fluorinated chemicals and two PFAS species. For the two PFAS species the value of 26% is total emissions to environment per annum for all stages of the life-cycle which are presented in the simplified table below

	Tonnage manufactured and sold per year in the EU.	Emissions per year in the EU.	Emissions / tonnage used
1-Propanaminium N-(carboxymethyl)-N N-dimethyl-3-[[[3 3 4 4 5 5 6 6 7 7 8 8 8-tridecafluorooctyl)sulfonyl]amino]- inner salt	21100	5500	26%
1-Propanaminium 3-amino-N-(carboxymethyl)-N N-dimethyl-N-[[[gamma-omega-perfluoro-C6-C16-alkyl)thio]acetyl] derives. inner salts	17200	4491	26%

Please note however that these calculations were done to inform the cost-effectiveness analysis and were not intended to be a precise estimate of emissions.

2.In terms of the second question regarding a sector-averaged emission percentage I think a good solution could be to use Table 5.1 (see below) from our report

Sector	Percentage share of the total (sales)	Annual usage rates	Live incidents (as a percentage of total use)	Training (as a percentage of total use)	Efficacy of bunding/control measures for training
Military	6%	17.5%	7%	93%	90%
Civil Aviation	9%	17.5%	7%	93%	97%
Municipal Fire service	13%	60%	93%	7%	90%
Chemical/petrochemical	59%	17.5%	7%	93%	97%
Marine applications	12%	17.5%	7%	93%	0%
Ready to use applications	1%	17.5%	100%	0%	N/A

The efficacy of wastewater treatment works is are considered extremely poor against PFAS (the model assumes 0%). The WWTWs in the model are assumed to simply to partition the PFAS between treated effluent and sludge so the columns on live training and efficacy are not directly relevant to help work up a sector-averaged emission percentage.

It should be possible to use the market shares from the first column and the annual usage rates from the second column to arrive at a sector-averaged emission percentage.

Regards

[REDACTED]

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