[redacted]

From: [redacted] <[redacted]
Sent: 05 July 2021 09:20
To: [redacted]
Subject: FW: Cyclotetrasiloxane in formulation of fighting foams with no PFAS
Attachments: SI-AR-NFF_3X3_BULK_BLEND_(R&D_only_-_not_for_commercial_sale)_MTR_AGHS_E....pdf; ANSUL General Bulletin No. 2021020 - ANSUL NFF 3x3 UL201 Non-Fluorinated Alcohol-Resistant Foam Concentrate; F-2021111.pdf; FS2101009_Ansul_Non-Fluorinated_Foam_brochure_A4_Final.pdf

Categories: Reference

FYI on C4-C6 as replacement of PFAS in fire fighting foam.
[redacted]

[redacted]

Project manager REACH PFAS restriction
[redacted]

www.chemischestoffengoedgeregeld.nl

From: [redacted] <[redacted]
Sent: maandag 5 juli 2021 00:40
To: [redacted] PFC - [redacted] <[redacted] [redacted] <[redacted] PFC Germany [redacted] <[redacted] [redacted] - USEPA <[redacted] - USEPA <[redacted] PFC US - [redacted] <[redacted] PFC US - [redacted] <[redacted] [redacted] <[redacted] PFC US - [redacted] <[redacted] PFC MDH [redacted] - Minnesota Department of Health <[redacted] PFC MDH [redacted] - Minnesota Department of Health <[redacted] PFC New Jersey - [redacted] - New Jersey Department of Environmental Protection <[redacted] Harvard School of Public Health <[redacted] PFC Canada - [redacted] <[redacted] [redacted] <[redacted] [redacted] <[redacted] [redacted] <[redacted]
Cc: [redacted] <[redacted]
Subject: RE: Cyclotetrasiloxane in formulation of fighting foams with no PFAS

Dear [redacted]
Thank you for this information. As far as I know, D4, D5, D6 are (cyclic) impurities that may be present in linear silicones/silanes/siloxanes. This means that though they are also PBTs, they are likely present in much lower levels than PFAS in AFFF, unless the silanes/siloxanes are about 20-100 times less effective and therefore used in higher amounts.

Silicones are often used as replacement of PFAS on food paper, e.g. baking paper. In these cases I would rather get the smaller levels of silicones (and their impurities) than the super persistent PFAS..

That said – it is kind of (really!) sad, that the producers have not (sufficiently!) given thought to that we really do not need or want anymore spreading of persistent chemicals in the environment, or for that sake in our water, food, or consumer products…

KR [redacted]

From: [redacted]
Sent: Friday, 2 July 2021 15.52
To: PFC - [redacted] PFC Germany [redacted] - USEPA [redacted] - USEPA [redacted] PFC US - [redacted] PFC US - [redacted] PFC US - [redacted] PFC MDH [redacted] - Minnesota Department of Health [redacted] PFC MDH [redacted] - Minnesota Department of Health [redacted] PFC New Jersey - [redacted] - New Jersey Department of Environmental Protection [redacted] Harvard School of Public Health [redacted] PFC Canada - [redacted] PFC Netherlands - [redacted] - National Institute for Public Health and the Environment [redacted]
Subject: Cyclotetrasiloxane in formulation of fighting foams with no PFAS

Dear all

How are you all. I trust all is good with all this Covid going around. Perth was in lock down again for 4 days and thank God it ends midnight today.

May I draw your attention to Cyclotetrasiloxane in formulation of fighting foams with no PFAS you been regulators, policy makers and advocates for the non-use of PFAS and chemicals of emerging concerns. You may already know about this.

There were suspicions but not much reliable publicly available information that foam manufacturers will move to use siloxane group of compounds as replacement for PFAS surfactant. This now proven true as Ansul which is owned by Johnson Controls an US company has come up with a foam formulation with Cyclotetrasiloxane called SI-AR-NFF3X3BULKBLEND – see attached documents.

It came to my attention as the Johnson Controls representative in Australia recently sent me the promote brochures (see attached) and a UK contact sent me the SDS. Somehow many foam manufacturers still send me information and updates even though I am no more in government. I found that to be very useful now as a consultant advising companies on their firefighting foam transition to F3, PFAS treatment and remediation and be amongst the first to know what is coming out in the market place.

In its Ansul SDS there is indication of Cyclotetrasiloxane 2,2,4,4,6,6,8,8-octamethyl- 556-67-2 in its foam formulation. Have been informed by a PFAS foam colleague in the UK that this

is a D4 siloxane and it may be an impurity from the synthesis of the main siloxane surfactant.

There are large differences in toxicity between cyclic siloxanes such as D5 or D6 (I am led to believe is banned) and linear / branched siloxanes.

Kindly note that the SDS clearly stated that it is R&D only–not for commercial use. As such I have written back to Johnson Control asking them the following:

1. Is the above Ansul foam to be marketed as a F3.
2. Is this the direction ANSUL, CHEMGUARD, SABO, SKUM and Williams now owned by Johnson Controls will be taking to make F3 using Cyclotetrasiloxane.
3. Whether other F3 manufacturers are also using Cyclotetrasiloxane in its foam formulation.

And awaiting their reply and will share with you all their response

As I know the representative m and have dealt with [redacted] for many years whilst in government and then out of government I thought in friendship forewarn [redacted] that the Ansul new foam may present concerns to their clients (I am) as Cyclotetrasiloxane has toxicity issue as stated by the EU as shown in: https://www.obelis.net/blog/cyclopentasiloxane-d5-and-cyclotetrasiloxane-d4-restricted-in-the-eu/ (I really like to know more about this and if the EU people in the email kindly introduce me to the right people in EU is very much appreciated as I fear if this is not addressed it may creep into F3 which I believe will be another nightmare. PFAS is bad enough).

I also understand Canada has a position on siloxane in that Environment Canada assessments concluded that cyclotetrasiloxane and cylcopentasiloxane, also known as D4 and D5, are toxic, persistent and have the potential to bioaccumulate in aquatic organisms (Ref: Suzuki, D. The Dirty Dozen: Siloxanes. 2010; Available from: https://davidsuzuki.org/queen-of-green/dirty-dozen siloxanes/)

Siloxane group has been found in Denko AFFF 1 %, 3 % and 6 % and its alcohol free AFFF formulation. To my knowledge so far Denko AFFF are the only ones to have also incorporated siloxanes to bolster its surfactant make up. Due to the complexity of firefighting foams and fluorine free foams and it's so called commercial secrecy, surprising information and data come forth now and then. Most studies and reviews tend to focus on firefighting foams made in the US, UK and Europe and little information for those made in India and China. To this day there is still anecdotal information and rumours that China and India still produce foams with PFOS however when asked several well established foam manufacturers in UK and Europe no one seems to be able to give me documented information or data or SDS to show the Indians and Chinese still made foams with PFOS. I even asked several Indian and Chinese foam companies whether they made foams with

PFOS and they categorically said no. I also asked them whether they make F3 and some proudly said yes as their use C6 formulation is F3 !! (which has the 6:2 FTS, 8:2 FTS and 10:2 FTS and all sorts of PFAS precursors nobody knows but found out to a certain extent by [redacted] and [redacted] colleagues in their analysis of groundwater contaminated by AFFF). I was just talking to a potential client in Singapore just now, a major organisation, as they are seeking my advice in transition to F3 and [redacted] told me a local Singapore foam vendor told [redacted] they can supply C6 foams to them which are deem fluorine free foams!. Not sure to whether to laugh or cry. Pathetic. Thank God Australia has gone pass this as this was also the case some 7 years ago and had many battles whilst in government against foam vendors advocating C6 foams as the friendly foam and the way to go. The good news is that more and more companies in Australia are looking to transition to using F3 and many have such as all Commonwealth managed airports, state firefighting departments except Tasmania, some ports and some oil gas and mining companies have already transition to use F3. Interestingly believe it or not our Australian Defence is still using Ansulite a C6 foam but to be fair as they transition to using F3 which is good (got that info from a presenter who is consulting with Defence to transit to F3 at last week national conference in Brisbane on firefighting foams of which I was an invited special guest to provide input).

And to finish off Australia firefighting foam policy in its chronological development:

July 2016 – Queensland Department of Environment and Science (DES) foam use policy (I was part of it as adviser and co-author whilst in government). The policy has been revised and awaiting Ministerial approval for release. Essentially the same except for TOF the analysis need to now look for C4 to C14 as previously it was only for C7 to C14. We suspected there were C4 used in foam formulation but did not have strong documentation and thought leave the fight for the next round when it is revised. PFAS precursors analysis is still there and need for TOPA and TOF is still in. But the allowance for C6 PFOA impurities in foam is still there which is another matter altogether and I leave it as that. Hence I am very keen to know more about the EU PFOA concentration in foam policy and I have communicated with some of you about this). We have unfinished business for sure even though I am no longer in government and still pushing the boundary.

Jan 2018 – SA EPA policy to ban all foams with PFAS and PFAS precursors with exemption on case by case basis. In the same month US Washington state also came up with similar policy and also with exemptions. SA EPA built from the Qld policy, gain courage and went one more bold step to ban foam with PFAS and PFAS precursors.

January 2020 – endorsement by Commonwealth and state environmental ministers to adopt the Australian National Environment Management Plan (commonly refer as NEMP) as Policy for dealing with and regulating (yes regulation) PFAS site contamination. Not a foam use policy but has direct implications on the use of PFAS foams.

June 2020 – NSW EPA foam policy. Not as detail and rigorous as Qld.

The above 4 policies now influence users on the use and choice of firefighting foams as companies are now trying to comply with all 4 policies in Australia hence many transitioning to F3 including Defence.

I trust the above is useful for you all to know what is happening in the firefighting foam space (if not already known) and its relation to Australia. Needless to say I intend to bring up the siloxane matter to the environmental regulators.

I purposely email you all to seek your expertise on siloxane group environmental and health impacts and its ensuing policy and regulation due your expertise, experience and knowledge on such matter.

Stay safe and healthy

kind regards

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