Message

From: Lindstrom, Andrew [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=04BF7CF26AA44CE29763FBC1C1B2338E-LINDSTROM, ANDREW]
Sent: 8/29/2019 10:29:44 AM
To: Wang Zhanyun (IfU, ESD) [zhanyun.wang@ifu.baug.ethz.ch]; Strynar, Mark [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=5a9910d5b38e471497bd875fd329a20a-Strynar, Mark]
CC: Washington, John [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=fdc3e8ce9f1d45c4894881ff420ca104-Washington, John]; Post, Gloria [Gloria.Post@dep.nj.gov]; McCord, James [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=McCord, James]; Goodrow, Sandra [Sandra.Goodrow@dep.nj.gov]; Bergman, Erica [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=user69ab393b]
Subject: RE: Information from Zhanyun Wang about Solvay replacement compounds

All,

The part of the ECHA dossier that deals with biodegradability indicates no degradation in the one standard test that was completed :

https://echa.europa.eu/registration-dossier/-/registered-dossier/5331/5/3/2

The test item cC6O4 was investigated for its ready biodegradability in a "28-Day DOC Die-Away Test" according to the Commission Regulation (EC) No 440/2008, C.4-A and the OECD Guideline for Testing of Chemicals, No. 301 A (1992). In the test flasks, containing the test item cC6O4 ammonium salt and activated sludge (inoculum), the mean concentrations of dissolved organic carbon (DOC) were not significantly different from the initial mean DOC concentration measured on Day 0. The test was valid as indicated by the performance of the procedure controls and toxicity controls. Therefore, cC6O4 ammonium salt was not biodegradable under the test conditions.

Considering the above, the same conclusion can be applied to F-Diox acid.

This conclusion is consistent with the data published in literature about biodegradability of fluorinated compounds.

PHYSICO-CHEMICAL PROPERTIES
- Melting point: 64.6 °C
- Boiling point: > 138 °C (the substance decomposes before boiling)
- Vapour pressure: 0.00000075 hPa at 25 °C
- Henry's law constant (for volatic substances) not applicable
- Water solubility (under test conditions): higly soluble (>= 667 g/L at 21.7 °C)
- log Pow: -0.38 at 22 °C

From: Wang Zhanyun (IfU, ESD) <zhanyun.wang@ifu.baug.ethz.ch>
Sent: Wednesday, August 28, 2019 12:33 PM
To: Strynar, Mark <Strynar.Mark@epa.gov>
Cc: Lindstrom, Andrew <Lindstrom.Andrew@epa.gov>; Washington, John <Washington.John@epa.gov>; Post, Gloria <Gloria.Post@dep.nj.gov>; McCord, James <mccord.james@epa.gov>; Goodrow, Sandra <Sandra.Goodrow@dep.nj.gov>; Bergman, Erica <erica.bergman@dep.nj.gov>
Subject: Re: Information from Zhanyun Wang about Solvay replacement compounds

Thanks, Mark. I know the lady who measured the substance in the river Po. Should it be helpful, I can put you two in touch, and I think she will be happy to share information. Just let me know. Thanks, and have a good day.

Sent from my iPhone

On 28 Aug 2019, at 15:42, Strynar, Mark <Strynar.Mark@epa.gov> wrote:

All,

Referring back to Gloria and Zhanyun's exchange back in December of 2018.

In this article from yesterday I found a link to a "New type of PFAS"
https://www.chemistryworld.com/features/a-persistent-perfluorinated-problem/3010817.article

This info took me to the new chemical found in the Po River called C604 (may need to translate from Italian to English) from a Miteni chemical plant
https://www.regione.veneto.it/web/guest/comunicati-stampa/dettaglio-comunicati?_spp_detailId=3301352

That chemical called C604 is registered under ECHA as this https://echa.europa.eu/registration-dossier/-/registered-dossier/5331/11/?documentUUID=e5b85b07-4da6-4307-ac5b-78c4d9483f98

<image002.png>

I will be checking in the NJ water samples we have analyzed to see if we see any indication of the presence of this PPA Solvay may be using.

Mark

From: Lindstrom, Andrew <Lindstrom.Andrew@epa.gov>
Sent: Wednesday, August 28, 2019 8:51 AM
To: Strynar, Mark <Strynar.Mark@epa.gov>
Subject: FW: Information from Zhanyun Wang about Solvay replacement compounds

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From: Post, Gloria <Gloria.Post@dep.nj.gov>
Sent: Wednesday, December 5, 2018 5:26 PM
To: Washington, John <Washington.John@epa.gov>; Lindstrom, Andrew <Lindstrom.Andrew@epa.gov>; Strynar, Mark <Strynar.Mark@epa.gov>
Cc: Bergman, Erica <erica.bergman@dep.nj.gov>; Goodrow, Sandra <Sandra.Goodrow@dep.nj.gov>; Maybury, Steve <Steve.Maybury@dep.nj.gov>
Subject: Information from Zhanyun Wang about Solvay replacement compounds

John, Mark, and Andy,

Thank you again for traveling to NJ to discuss your data with us. What we heard in the short time that you were here was very informative! I am very sorry that you needed to leave so suddenly, and I hope that all of you had a safe trip home!

I reached out to Zhanyun Wang to ask if he knew where the Solvay replacement could be obtained. Please see my correspondence with him below. He believes that Solvay makes this substance, but he does not know where it can be obtained.

Additionally - he also mentions that Solvay **recently obtained a patent for a newer replacement substance/process using PFAS with totally different structures (cyclic)**, and that **use of these newer substances in the manufacture of polyvinylidene fluoride (PVDF, Kynar) is mentioned in the patent**.

He sent links to an EFSA document and the patent for this new replacement. See correspondence below, with the most important information highlighted by me.

NJDEP has no information about whether or not the NJ Solvay facility is now using this newer replacement (I guess we could call it the replacement replacement?)

****JOHN**:** I did not mention your question about whether the structure of the Solvay replacement in Zhang et al. (2013) is slightly incorrect. If you want to ask Zhang about that, you should email him.

I hope that this information is helpful.

Thanks again for all of your work on the New Jersey project!

Gloria

From: Wang Zhanyun (IfU, ESD) <zhanyun.wang@ifu.baug.ethz.ch>
Sent: Wednesday, December 05, 2018 8:57 AM
To: Post, Gloria <Gloria.Post@dep.nj.gov>
Subject: [EXTERNAL] Re: Question about product shown in Zhang et al. (2013)

Dear Gloria,

The substance is registered under REACH by Miteni in 2012 (which recently claimed bankruptcy) and Solvay in 2018, so I think it's a Solvay product. I know (almost) for sure that this substance has been used by Solvay as an emulsifier in PTFE production (as I talked to one Solvay person at a workshop and they have a couple of patents on this). I've also found a patent from Solvay using this substance in the production of PVDF (https://patents.google.com/patent/US20140228531?oq=hod+for+manufacturing+fluoropolymers+in+the+presence+of+cyclic+fluorosurfactants+with+low+bioaccumulation%2fbiopersistence, see example 10 **(***GLORIA NOTE: Example 10 is at [0186] in the document; also – this is a U.S. patent***)**. So I would say it's likely that this substance has been used in the PVDF production as well.

Best regards,
Zhanyun

On 5 Dec 2018, at 14:23, Post, Gloria <Gloria.Post@dep.nj.gov> wrote:

Dear Zhanyun,

Thank you so much for your very helpful and quick response to my question.

In regard to use of emulsifiers in fluoropolymer production, the EFSA document you sent about the newer Solvay replacement (https://efsa.onlinelibrary.wiley.com/doi/epdf/10.2903/j.efsa.2014.3718) mentions the use of 2-[(5-methoxy-1,3-dioxolan-4-yl)oxy]}, ammonium salt "during the polymerization process of fluoropolymers such as tetrafluoroethylene homopolymer **and others**."

Solvay produces Kynar (polyvinylidene fluoride; PVDF) in a facility located in our state, New Jersey. Solvay previously used Surflon S-111 as an emulsifier in the production of PVDF at its New Jersey facility. This process is described in the Supplementary Information of Prevedouros et al. (2006) https://pubs.acs.org/doi/suppl/10.1021/es0512475/suppl_file/es0512475.pdf .

As you probably know, Surflon S-111 is a technical mixture consisting primarily of PFNA, with smaller percentages of C11, C13, and other PFAAs. See Tables copied from Supplementary Information of Prevedouros et al. (2006) below.

Solvay stopped using Surflon S-111 at its New Jersey facility in 2010 as part of the Voluntary Stewardship Agreement of major manufacturers with USEPA to end use of PFOA, its precursors, and higher homologues (including PFNA and longer chain PFAAs). It is our understanding that Solvay continues to manufacture PVDF at its New Jersey facility, and that replacement(s) for the phased-out long-chain PFAAs are now being used as emulsifiers.

Do you know if the [new replacement] chemical discussed in the EFSA document (CAS No 1190931-27-1) is a Solvay product, and/or if it is used by Solvay as an emulsifier in fluoropolymer (i.e. PVDF) production?

Any information that you have about these questions would be very much appreciated.

Best regards,
Gloria

COPIED FROM SUPPLEMENTARY INFORMATION IN PREVEDOUROS ET AL. (2006):

<pastedImage.png>

<pastedImage.png>

From: Wang Zhanyun (IfU, ESD) <zhanyun.wang@ifu.baug.ethz.ch>
Sent: Wednesday, December 5, 2018 4:55 AM
To: Post, Gloria
Subject: [EXTERNAL] Re: Question about product shown in Zhang et al. (2013)

Dear Gloria,

thanks for your email. Unfortunately, I don't have much information on this substance. But I think this substance mixture is manufactured by Solvay themselves, as Bob [*Gloria note: I assume he means Bob Buck*] from Dupont told me once that all major fluoropolymer manufacturers (Daikin, 3M, Chemours, Asahi and Solvay) are now using their own emulsifier

and I've found a patent from Solvay (formerly Ausimont) showing a similar structure, see Structure 3 (https://patents.google.com/patent/EP0315078A2/en). It is likely that this substance mixtures is a short-chain homologue of the perfluoropolyethers produced by Solvay (Fomblin, Solvera, Galden or Fluorolink), similarly to GenX is a short-chain homologue impurity produced during the production of Krytox. I don't know if it's possible to purchase this substance mixture … Andy from US EPA recently told me that they've detected this substance mixture in the environment. Perhaps he would have some reference standards or know how to get this product.

In addition, **Solvay have likely already changed to another emulsifier in their fluoropolymer production: https://efsa.onlinelibrary.wiley.com/doi/epdf/10.2903/j.efsa.2014.3718**

Hope this helps. Should you have any other questions, please do not hesitate to let me know. Have a good day!

Best regards,
Zhanyun

On 4 Dec 2018, at 22:44, Post, Gloria <Gloria.Post@dep.nj.gov> wrote:

Dear Zhanyun,

I have a question that you may be able to help with. Do you have any information on the product labeled as "Solvay's product (CAS No. 329238-24-6)" in Figure 1 of your 2013 paper? (Please see attached scanned page.)

Do you know whether Solvay manufactures this product or purchases it from someone else? Do you know if it is possible to purchase or otherwise obtain this product (or any of its component congeners)?

This information, and any other information that you may have about this product, would be greatly appreciated.

Best regards,
Gloria

Gloria B. Post, Ph.D., DABT
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<Wang et al 2013 figure 1.pdf>

<solvay 1190931-41-9.sk2>