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Expert Blog

The Definition of PFAS Should Be Science Based

Attempts to weaken the PFAS definition threaten public health and the environment.

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Nonstick products like this frying pan can contain harmful PFAS chemicals. | *Cooker King via Unsplash* <*https://unsplash.com/photos/black-cooking-pan-with-silver-spoon-gbgqzgxic90*>

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Under Attack

States are taking the lead to address the global per- and polyfluoroalkyl substances (PFAS) contamination crisis, passing legislation in at least 14 states <https://www.saferstates.org/wp-content/uploads/pfas-upstream-state-action-12.20.2023.pdf> to ban or phase out the unnecessary use of harmful PFAS chemicals. However, there have been recent efforts to undermine these needed public health protections by attempting to more narrowly define the universe of PFAS. For example, a bill currently moving through the Indiana <https://iga.in.gov/pdf-documents/123/2024/house/bills/hb1399/hb1399.02.comh.pdf> legislature, attempts to carve out exclusions for certain groups of PFAS, including large, polymeric forms of PFAS and those that are gases. But scientists <http://tinyurl.com/definingpfas> agree that PFAS - including polymers and those that are gases - ARE PFAS. While policy makers may choose to take action on certain PFAS chemicals, the definition of PFAS should be science-based and not based on the preferences of PFAS manufacturers and users.

Urgent Actions Are Needed

PFAS are a class of more than 14,000 man-made chemicals that are widely used for their oil and water repellency, temperature resistance, and friction reduction. In other words, PFAS can make things grease and water proof, stain resistant, and non-stick. PFAS can also make us sick. Exposures to PFAS are associated with a wide range of human health effects <https://www.atsdr.cdc.gov/pfas/docs/pfas-info-for-clinicians-508.pdf>, including kidney and testicular cancer, increases in cholesterol levels, changes in liver enzymes, and decreases in birth weight, and immune system function.

PFAS contamination of our environment, including the water we drink, the soil we grow our crops in, and the air we breathe, is so widespread that it has become a global crisis <https://pubs.acs.org/doi/10.1021/acs.est.2c02765>. PFAS even contaminate us, with 98% of Americans having one or more PFAS in our blood <https://pubmed.ncbi.nlm.nih.gov/18007991/>. The production, use, and disposal of polymeric and gaseous PFAS contribute to widespread PFAS pollution. In fact, it is the production of polymers <https://doi.org/10.1021/acs.est.0c03244> like Teflon that is responsible for the devastating and extensive contamination in places like West Virginia <https://www.simonandschuster.com/books/exposure/robert-bilott/9781501172823> and North Carolina <https://grist.org/accountability/un-declares-pfas-pollution-in-north-carolina-a-human-rights-violation/>. And there is

no scientific reason a PFAS should not be considered a PFAS if it is in gas form. We can still be exposed <https://doi.org/10.1021/acs.est.2c06715> to these PFAS and they can still cause harm. This is why urgent actions are needed to turn off the tap on ALL PFAS.

PFAS Are PFAS

The definition <https://www.saferstates.org/wp-content/uploads/pfas-definition-factsheet_2.7.2024.pdf> of PFAS is based on the chemistry that imparts persistence to these chemicals - the carbon-fluorine bond, which is the strongest single bond in organic chemistry. The science-based definition of PFAS as chemicals containing "at least one fully fluorinated carbon atom" is already in use in 23 states (AR, AZ <https://www.azleg.gov/legtext/54leg/1r/laws/0222.pdf>, CA, CO <http://leg.colorado.gov/sites/default/files/2019a_1279_signed.pdf>, CT <https://www.cga.ct.gov/2021/act/pa/pdf/2021pa-00191-r00sb-00837-pa.pdf>, GA <https://www.legis.ga.gov/api/legislation/document/20192020/187641>, HI <https://www.capitol.hawaii.gov/session2022/bills/hb1644_.htm>, IL, IN <https://iga.in.gov/laws/2021/ic/titles/36#36-8-10.7-3>, KY <https://apps.legislature.ky.gov/recorddocuments/bill/19rs/sb104/bill.pdf>, LA, MD <https://mgaleg.maryland.gov/2022rs/bills/sb/sb0273e.pdf>, ME, MN, NH <http://www.gencourt.state.nh.us/legislation/2019/sb0257.html>, NV <https://www.leg.state.nv.us/app/nelis/rel/81st2021/bill/7397/text#>, NY <https://www.nysenate.gov/legislation/bills/2019/s8817>, OH, OR <https://olis.oregonlegislature.gov/liz/2023r1/downloads/measuredocument/sb543/enrolled>, RI <http://webserver.rilin.state.ri.us/billtext/billtext22/senatetext22/s2044a.pdf>, VA <https://law.lis.virginia.gov/vacode/title9.1/chapter2/section9.1-207.1/>, VT <https://legislature.vermont.gov/documents/2022/docs/acts/act036/act036%20as%20enacted.pdf>, and WA) and by Congress in the National Defense Authorization Act in 2021, 2022, and 2023. This definition is similar to that stated by the Organisation for Economic Co-operation and Development (OECD) and adopted by the European Union in their pending regulation <https://echa.europa.eu/da/registry-of-restriction-intentions/-/dislist/details/0b0236e18663449b> of PFAS. The OECD definition was developed by an international group of scientists representing a variety of stakeholder viewpoints, including scientists from the US EPA and multiple other foreign government agencies, industry (Chemours), and independent academic institutions.

In fact, even industry scientists have previously stated <https://news.bloomberglaw.com/environment-and-energy/insight-finding-a-middle-ground-on-pfas-using-a-four-step-process> "..polymers and non-polymers .. Some are large molecules. Others are small. Some are bioavailable, some are not. All are [illegible]." And a peer reviewed article <https://doi.org/10.1093/toxsci/kfaa123> funded by the

FluoroCouncil and American Chemistry Council, which are trade groups representing PFAS producers, stated "PFAS can be identified by the presence of at least one fully fluorinated carbon-carbon bond (Buck et al., 2011; Wang et al., 2017). PFAS can be subdivided into 2 broad classes: polymers and nonpolymers." So why the recent debate? Perhaps it is because PFAS are increasingly being managed as a class to avoid regrettable substitution of one toxic PFAS for another, and many sectors of PFAS manufacturers and users are now facing increasing regulation and scrutiny.

Perhaps, it could also be due in part to EPA's refusal to adopt a scientifically based agency-wide definition. In response to widespread criticism <https://www.nrdc.org/sites/default/files/2023-08/administrator-regan-epa-definition-pfas-letter-20230103.pdf> of EPA's previous "working definition" of PFAS, from drinking water utilities associations, state environmental agencies, independent scientists with expertise in PFAS, environmental and health NGOs, and 17 Attorneys General, EPA opted instead to define PFAS on a case-by-case basis <https://blog.ucsusa.org/anita-desikan/epas-new-pfas-definition-will-make-it-harder-to-protect-the-public/>. Dr. Linda Birnbaum, former EPA scientist and Director of the National Toxicology Program, summarized <https://www.theguardian.com/environment/2023/aug/18/epa-new-definition-pfas-forever-chemicals> this decision best:

"This is not a new definition – it is a lack of definition, and it makes no sense. It is just going to lead to terrible confusion."

Linda Birnbaum, PhD

Policy makers (and EPA) should not be fooled by alternative definitions put forward by industries with financial conflict of interest. While the scope of any one policy could be open for discussion, the definition of PFAS should always be science-based.

Relabeling PFAS Is Not a Solution

The bill moving through the Indiana legislature is even more egregious when one learns that Indiana has already <https://iga.in.gov/laws/2021/ic/titles/36#36-8-10.7-3> incorporated the science-based definition of PFAS as chemicals containing "at least one fully fluorinated carbon atom" into its state code. Unfortunately, this bill likely reflects just one example of how PFAS

ufacturers and users are trying to exempt their products from upcoming PFAS

regulations. But in order to protect public health and the environment, the entire class of PFAS must be properly identified and addressed. Pretending that some PFAS do not exist will not make them go away. The definition of PFAS should not be manipulated to create forever exemptions <https://www.nrdc.org/bio/anna-reade/pfas-no-forever-exemptions-forever-chemicals> for some PFAS like polymers and gases. Doing so will limit states' ability to address PFAS in the future.

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