STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
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January 4, 2024

Michael S. Regan, Administrator
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue NW
Washington DC 20460

Sent via certified mail, return receipt requested and via email to Regan.Michael@epa.gov

RE: Toxic Substances Control Act Petition – Polychlorinated Biphenyls

Dear Administrator Regan:

On behalf of the State of Washington, the Department of Ecology petitions the United States Environmental Protection Agency to initiate rulemaking to safeguard public health against polychlorinated biphenyls (PCBs) in consumer products. This petition is submitted pursuant to Section 21 of the Toxic Substances Control Act (TSCA).

Specifically, Ecology requests EPA commence rulemaking to eliminate the current allowances for PCBs in consumer products. Some PCB allowances are attributable to regulatory exemptions granted by EPA. However, our research has shown that when PCBs are found in consumer products, they are byproducts known to be associated with pigments, paints, or inks used in the manufacturing process. These inadvertent PCBs currently allowed under TSCA directly expose people and contribute to PCB contamination in the environment. We believe the weight of scientific evidence clearly establishes significant health and environmental harms from PCB exposure and justifies eliminating TSCA's current allowances for inadvertent PCBs.

Washington State's people and environment, including sensitive species, are exposed to PCBs in the consumer products we use and discard every day. Scientific evidence demonstrates harms to both human health and the environment from PCBs, including toxicity, cancer, developmental toxicity, and endocrine disruption. Eliminating current allowances for PCBs in consumer products will reduce significant sources of exposure and environmental contamination.

To address these concerns, Washington State requests that EPA take the actions detailed in the attachment and commence rulemaking as soon as possible to reduce human and environmental exposures to PCBs.

We thank you for your prompt attention to this petition. If you have any questions, please contact Katrina Lassiter, Hazardous Waste and Toxic Reduction Program Manager, at 360-791-0879 or katrina.lassiter@ecy.wa.gov.

Yours Truly,

Laura Watson
Director

cc: Thomas M. Groeneveld, EPA
Katrina Lassiter, Ecology

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Petition under TSCA Section 21 – Polychlorinated Biphenyls

Requested Action

Based on the multiple harms caused by PCBs when humans are exposed or when they are released into the environment, Washington State petitions EPA to take the following actions:

1. Commence rulemaking to reassess limits on allowable inadvertent PCBs found in consumer products. This specifically includes as detailed in the definitions of "excluded manufacturing process" and "recycled PCBs" found in 40 CFR 761.3.
2. Adopt a new rule that identifies use of pigments containing PCBs as a "use" of PCBs.
3. In collaboration with state and tribal governments, establish new, lower limits on allowable inadvertent PCBs in consumer products. We suggest an eventual limit of zero, phased in over a ten-year period, along with identification of applicable test methods.
4. In collaboration with state and tribal governments, establish priority consumer products that will be subject to lower allowable limits of inadvertent PCBs at an earlier date. We suggest these lower limits could initially apply to paints and inks, with an effective date for zero PCBs within five years. We also suggest pigments should be subject to an earlier effective date for zero PCBs within of seven years.
5. In collaboration with state and tribal governments, reassess limits on all allowable PCBs found in commercial products, as detailed in 40 CFR 761, et seq., and establish a rulemaking schedule for the adoption of revised regulations.

1. Commence rulemaking to reassess limits on allowable inadvertent PCBs in consumer products

Currently, the definitions of "excluded manufacturing process" and "recycled PCBs" in 40 CFR 761.3 both establish allowed limits for inadvertent PCBs in consumer products. As noted in more detail below, these limits were not established based on best available science, but instead were a compromise developed by industry and environmental advocates. These limits—50 ppm with an annual average of 25 ppm for the product line—allow ongoing and continuous human and environmental exposure to inadvertent PCBs. These limits also do not consider the multiple exposures we experience daily; every time we touch a painted or printed surface, we are likely being exposed.

We believe the current regulatory limits for inadvertent PCBs in consumer products are far too high and are a demonstrated threat to human health and the environment. We request EPA commence a rulemaking proceeding to lower or eliminate allowances for inadvertent PCBs in consumer products.

2. Adopt a new rule to define "use" of PCBs when safer alternatives are available

We believe it is important that non-essential uses of PCBs be eliminated. Ecology also believes the scientific evidence demonstrates that PCBs in pigments result in both human exposures and environmental contamination.

As part of the new rulemaking pursuant to this petition, we request EPA adopt a regulation that identifies the use of pigments containing inadvertent PCBs to be a "use" of PCBs, subject to the applicable limitations under 40 CFR 761.20(a). In the alternative, we request the regulation identify use of pigments containing inadvertent PCBs is a "use" of PCBs when an alternate process is available and does not create inadvertent PCBs.

3. Collaborate with state and tribal governments to establish new, lower regulatory limits on inadvertent PCBs and identify appropriate test methods

It is important that the rulemaking proceedings include all relevant stakeholders, including state and tribal governments. Petitioners request that EPA collaborate with states and tribes to develop rule language establishing new, lower limits on allowable inadvertent PCBs in consumer products. We suggest an eventual limit of zero, phased in over a ten-year period. Conducting an active stakeholder dialogue before developing rule language will be important to ensure the new regulations are feasible and meet their intended purpose.

We acknowledge that test detection limits do involve some uncertainty: is a product truly PCB-free or is the amount of PCBs in the product simply less than what the test can detect? To address this issue and provide clarity for industry and states, we also request EPA establish a rule that identifies applicable and acceptable test methods.

4. Collaborate with state and tribal governments to phase in lower limits, starting with priority consumer products

Phasing in lower limits for allowable inadvertent PCBs could be a strategy to help minimize impacts on industry from the new regulations. We request EPA collaborate with states and tribes before proposing new rules to identify priority consumer products that will be subject to lower limits at an earlier date. This approach will reduce exposures quickly while minimizing impacts on industry. We suggest these lower limits would initially apply to paints and inks, with an effective date for zero/non-detect PCBs within five years. We also suggest pigments used in products other than paints or inks should be subject to an earlier effective date for zero/non-detect PCBs within of seven years.

5. Collaborate with state and tribal governments to reassess limits on allowable non-inadvertent PCBs

Finally, we believe it is important that EPA reassess limits on any PCBs currently allowed in all commercial products, including instances where EPA has determined the PCBs are "totally enclosed" or result from an "excluded manufacturing process." We request EPA collaborate with states and tribes to establish new, lower limits on all consumer products containing PCBs and a rulemaking schedule for the adoption of revised regulations.

Background: EPA Actions, Activities, and Regulations

EPA has taken a series of actions to regulate the use and presence of PCBs in consumer products. While EPA's primary focus was on the intentional use of PCBs, some federal regulations address the presence of inadvertent PCBs as well.

The manufacture, processing, or distribution of PCBs was restricted when TSCA was adopted on October 11, 1976. Section 6(e)(1) of TSCA, now codified at 15 U.S.C. 2605, required EPA to commence rulemaking within six months of the effective date of the act (*i.e.*, July 1, 1977). EPA subsequently published draft regulations on May 24, 1977.

On February 17, 1978, EPA published the final rule regarding disposal and marking requirements for PCBs. This rule package did not address general consumer products but instead was focused on industrial and commercial products.

In 1982, EPA adopted amended rules, largely in response to a decision from the U.S. Court of Appeals in *Environmental Defense Fund, Inc. v. Environmental Protection Agency*, 636 F.2d 1267 (D.C. Cir. 1980). The court set a regulatory cutoff of 50 ppm, which was reflected in the amended rule. Like the original 1978 rule, the amended rule likewise did not address consumer products. The final rulemaking notice detailed a variety of human health and environmental harms arising from PCB exposure. That rulemaking notice stated, in part:

> The health effects data base for PCBs is continuously increasing. The Agency will consider any additional pertinent information on health and environmental effects and information on risks associated with PCBs during the development of [the 1984] rulemaking.[1]

Additional rulemaking amending the 1982 rule was finalized in July 1984. Among other actions, this rulemaking "permit[s] the manufacture, processing, distribution in commerce, and use of inadvertently generated and recycled PCBs under limited circumstances."

In the 1984 rulemaking notice, EPA also made the following determinations regarding PCBs:

- PCBs are toxic and persistent.
- PCBs may cause reproductive effects, developmental toxicity, and oncogenicity in humans.
- Some PCBs have the ability to alter reproductive processes in mammalian species, even at doses that do not cause other signs of toxicity.
- Prenatal exposure to PCBs can result in various degrees of developmentally toxic effects.
- Chloracne may occur in humans exposed to PCBs.
- PCBs can be concentrated in both marine and freshwater organisms.
- Humans can be exposed to PCBs through consumption of PCB-containing food sources.
- PCBs affect the productivity of phytoplankton and the composition of phytoplankton communities.
- PCBs cause deleterious effects on environmentally important freshwater invertebrates.

[1] 47 Fed. Reg. 37344

- PCBs impair reproductive success in birds and mammals.
- PCBs are toxic to fish at very low exposure levels.
- Various sublethal physiological effects are attributed to PCBs.
- Abnormalities in bone development and reproductive organs attributable to PCBs have been demonstrated.

Like the 1982 rulemaking, the 1984 rulemaking notice[2] references actions related to *EDF v. EPA*. After the court invalidated some elements of the original 1978 rulemaking, the Environmental Defense Fund, Chemical Manufacturers Association, and Natural Resources Defense Council ("Advocates") agreed to make a set of recommendations regarding allowable levels of inadvertent PCBs in consumer products. The 1984 rulemaking notes that EPA mostly accepted these recommendations.

At primary issue for this petition is the proposal from the Advocates that "Concentrations of inadvertently generated PCBs in products are to be limited to a 25 ppm average per year and a maximum of 50 ppm at any given time."[3] EPA accepted this proposal from the Advocates with one exception; for consumer products with high potential for exposure, such as deodorant bars, this recommendation was rejected, and a lower limit of 5 ppm was adopted. "This limit is more protective of consumers who are often unaware of potential hazards from exposure to chemicals in consumer use products."[4]

There is no indication in the 1984 rulemaking notice that the limits proposed by the Advocates and adopted by EPA are based on any specific scientific study or reasoning.

TSCA Section 21 Authority

Under 15 U.S.C. 2620, commonly referred to as TSCA Section 21, any person may petition EPA to initiate a rulemaking proceeding for the issuance, amendment, or repeal of a rule adopted under specified TSCA sections. A Section 21 petition must set forth facts that establish the need for the requested rule change. EPA is required to either grant or deny the petition within 90 days of its filing. If EPA grants the petition, they must start an appropriate rulemaking process. If EPA denies the petition, they must publish a Federal Register notice detailing the reasons for the denial. If EPA does not issue a decision within the 90-day period, the petitioner may file a civil action in the applicable federal District Court to compel EPA to begin the requested rulemaking proceeding. Any civil action must be filed no later than 60 days after the end of the applicable 90-day period. A petitioner may also file a civil action if the petition is denied; in that case, the action must be filed no later than 60 days after EPA denies the petition.

TSCA Section 21 requires that the petition "set forth the facts which it is claimed establish that it is necessary to issue, amend or repeal a rule under section 2603, 2605, or 2607 of this title…" 15 U.S.C. 2620(b)(1). This petition requests EPA to reassess rules adopted June 27, 1984, pursuant to authority under "Sec. 6, Pub. L. 94-469, 90 Stat. 2020 (15 U.S.C. 2605)," thereby making it subject to a Section 21 petition.

[2] 49 Fed. Reg. 28172–28193
[3] 49 Fed. Reg. 28174
[4] 49 Fed. Reg. 28181

Requirement for Best Available Science

15 U.S.C. 2625(h) requires that, "[i]n carrying out sections 2603, 2604, and 2605 of this title, to the extent that the Administrator makes a decision based on science, the Administrator shall use scientific information, technical procedures, measures, methods, protocols, methodologies, or models, employed in a manner consistent with the best available science." 15 U.S.C. 2625(i) also requires that, "[t]he Administrator shall make decisions under sections 2603, 2604, and 2605 of this title based on the weight of the scientific evidence."

In the final TSCA Risk Evaluation Rule, 40 CFR 702.33, EPA defined "best available science" as "science that is reliable and unbiased" and that "involves the use of supporting studies conducted in accordance with sound and objective science practices, including, when available, peer reviewed science and supporting studies and data collected by accepted methods or best available methods (if the reliability of the method and the nature of the decision justifies use of the data)."

Additionally, the rule also defined "weight of scientific evidence" as "a systematic review method, applied in a manner suited to the nature of the evidence or decision, that uses a pre-established protocol to comprehensively, objectively, transparently, and consistently, identify and evaluate each stream of evidence, including strengths, limitations, and relevance of each study and to integrate evidence as necessary and appropriate based upon strengths, limitations, and relevance."

In preparing this petition, Washington State has relied on the best available science, including independent third-party peer reviewed studies and government publications. The References section of this petition details which type of review each citation underwent.

Information Supporting and Justifying the Requested Action

Background

Historically, PCBs were used intentionally in a wide range of products, such as electronic equipment, caulking, and carbon copy paper. Most intentional uses, often termed "legacy" uses, have been banned in the United States since 1979. Inadvertent PCBs are PCBs that are not intentionally added to products but are instead produced as an unintended byproduct of the manufacturing process. Legacy PCBs are present in some products still in use (such as fluorescent lamp ballasts manufactured prior to the 1979 ban) and are still a large source of new environmental contamination.[5] However, in its recent work to address PCBs, Washington State identified inadvertent PCBs as the predominant source of new PCBs in consumer goods.[6]

There are 209 distinct PCB compounds (known as congeners) which differ depending on the number and location of the chlorine portion of the molecule. Different congeners have different physical properties,

[5] See Washington State Department of Ecology at https://apps.ecology.wa.gov/publications/documents/2004019.pdf
[6] See Washington State Departments of Ecology and Health at https://apps.ecology.wa.gov/publications/SummaryPages/1507002.html

toxicity, and environmental fates. However, there are characteristics that are applicable to all PCBs. This petition is based on these common characteristics.

Known effects of PCBs

EPA's research and conclusions

As noted above, at the time of the 1984 rulemaking, EPA identified multiple harms to both human health and the environment coming from PCBs. Congress directed an additional review in 1996. EPA's *Cancer Dose-Response Assessment for Polychlorinated Biphenyls (PCBs) and Application to Environmental Mixtures* noted that in addition to being linked in increased cancer risk, "…PCBs also have significant ecological and human health effects other than cancer, including neurotoxicity, reproductive and developmental toxicity, immune system suppression, liver damage, skin irritation, and endocrine disruption. Toxic effects have been observed from acute and chronic exposures to PCB mixtures with varying chlorine content. These toxic effects should be included along with cancer in future assessments of PCBs."[7]

Research from other authorities

Since EPA adopted the rule allowing small amounts of inadvertent PCBs in consumer products, additional government authorities and scientific researchers have continued to add to the scientific knowledge about the effects of PCBs. Some of that peer-reviewed research is summarized below.

PCBs are persistent, bioaccumulative, and toxic

The Convention for the Protection of the Marine Environment of the North-East Atlantic (commonly known as the "OSPAR Convention") concluded that PCBs "are toxic and, since they are hydrophobic, bioconcentrate particularly in fatty tissues. They can adversely affect reproduction, and may affect immune systems so as to make disease epidemics worse. The higher levels of the food web, especially fish-eating birds and marine mammals, are particularly affected."[8]

The United Nations Environment Programme Stockholm Convention reports that, "Of the 209 different types of PCBs, 13 exhibit a dioxin-like toxicity. Their persistence in the environment corresponds to the degree of chlorination, and half-lives can vary from 10 days to one-and-a-half years."[9]

PCBs are carcinogens

The U.S. National Toxicology Program *Report on Carcinogens, Fifteenth Edition*, *2021* concluded that PCBs, "…are reasonably anticipated to be human carcinogens based on sufficient evidence of carcinogenicity from studies in experimental animals."[10] This conclusion is also supported by the International Agency for Research on Cancer, which concluded that PCBs—as a class—are classified as Group 1 carcinogens.[11]

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[7] See USEPA at https://www.epa.gov/sites/default/files/2015-10/documents/pcbs_cancer_dose-response_assessment_and_application_to_environmental_mixtures.pdf
[8] See OSPAR Commission at https://www.ospar.org/documents?v=6918
[9] See UNEP at https://chm.pops.int/TheConvention/ThePOPs/The12InitialPOPs/tabid/296/Default.aspx
[10] See NTP at https://ntp.niehs.nih.gov/sites/default/files/ntp/roc/content/profiles/polychlorinatedbiphenyls.pdf
[11] See International Agency for Research in Cancer at https://www.ncbi.nlm.nih.gov/books/NBK361696/

PCBs are developmental toxicants

Both the State of California[12] and Agency for Toxic Substances and Disease Registry[13] report there is substantial evidence that PCB exposure can cause adverse developmental effects in humans.

PCBs are potential endocrine disruptors

Agency for Toxic Substances and Disease Registry concluded, "PCBs can affect a wide variety of endocrine systems by directly affecting the components of the endocrine system such as hormones, metabolic enzymes, carrier proteins, receptors, endocrine glands, and feedback regulation systems. Effects on these components can lead to alterations in neurodevelopment, reproduction, and in induction of endocrine-sensitive tumors."[14]

Potential for exposure among sensitive populations

Nearly all people, including infants, are exposed to PCBs

Although levels of PCBs in people have declined since the 1980s, they are still widely detected in the U.S. population, including in infants and children.[15] People are mostly exposed to a mixture of PCBs rather than a single PCB compound.

PCBs have been detected in human blood, fat tissue, breast milk, and cord blood.[16] Some PCBs can remain in the body for years after exposure—varying by type of organism and the specific PCB congener—and blood levels generally increase with age.[17] Because PCBs are more readily absorbed than excreted, the levels of individual PCB congeners in the body may vary by exposure source and by differences in how bodies process them.[18]

PCBs have been measured and detected in the blood of the U.S. general population (ages 11 and older) since the 1999 National Health and Nutrition Examination Survey.[19, 20] PCB congeners 118, 138, 153, and 180 have been found at higher levels in the environment and in human blood samples than other PCB congeners and were detected in the majority of samples for women aged 16–49 from 1999–2014.[21] Levels of PCBs measured in human blood decreased by an estimated 87 percent from 1973–2003.[22, 23]

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[12] See California OEHHA https://oehha.ca.gov/proposition-65/chemicals/polychlorinated-biphenyls
[13] See ATSDR at https://www.atsdr.cdc.gov/ToxProfiles/tp17.pdf
[14] Id.
[15] See Washington Departments of Ecology and Health at https://apps.ecology.wa.gov/publications/SummaryPages/1507002.html
[16] See ATSDR at https://www.atsdr.cdc.gov/ToxProfiles/tp17.pdf
[17] See Washington Departments of Ecology and Health at https://apps.ecology.wa.gov/publications/SummaryPages/1507002.html
[18] See CDC at https://www.cdc.gov/biomonitoring/NDL-PCBs_BiomonitoringSummary.html
[19] See CDC at https://stacks.cdc.gov/view/cdc/75822
[20] See CDC at https://stacks.cdc.gov/view/cdc/75823
[21] See USEPA at https://www.epa.gov/sites/default/files/2015-05/documents/biomonitoring-pcbs.pdf
[22] Id.
[23] See Sjödin, Jones, Focant, Lapeza, Wang, and McGahee at https://ehp.niehs.nih.gov/doi/10.1289/ehp.112-1241957

However, PCB 153 was detected in both children and adults more recently, with a median level of 7.4 ng/g lipid in six- to nine-year-old girls, and 0.21–55.6 ng/g lipid in the general population.[24, 25]

In 2013, studies reported the presence of PCB 11, which is associated with inadvertent PCB production, in air samples and in the blood of children and mothers.[26, 27] This is an indication that airborne PCBs continue to be an environmental problem affecting large populations. A 2015 study reported PCB congeners 11, 14, 35, 133, and 209 as the most frequently detected non-Aroclor congeners in the blood of participants.[28] More information on PCB exposures in people is available in Washington's PCB Chemical Action Plan.[29]

Exposure pathways

Food is the main source of exposure for the general population, and the levels of PCBs in fish we eat are concerning. PCBs occur at the highest concentrations in fatty foods (*e.g.*, dairy products and fish). PCBs from consumer products, including paints and inks, may enter fish through stormwater and wastewater effluent, thus leading to human dietary exposure.[30]

Potential for exposure among sensitive species

PCBs have been found in Washington's environment

PCBs have been found in freshwater, marine water, and sediment in Washington State. PCB levels in Washington mussels, an indicator species for detecting local environmental contamination, are found well above national median concentrations.[31] PCBs, including PCB 11, have been detected in atmospheric deposition in the Seattle metro area.[32] See Ecology's Chemical Action Plan for more details on PCBs in Washington's environment.[33]

The fish tissue equivalent of Washington's human health water quality criterion for PCBs is 5.3 ppb.[34] Washington Department of Fish and Wildlife measured the total PCB concentrations in edible tissues of four marine fish species as compared to this value. All samples of Herring and Chinook, and most (70–80

[24] See USEPA at https://www.epa.gov/sites/default/files/2015-05/documents/biomonitoring-pcbs.pdf
[25] See CDC https://stacks.cdc.gov/view/cdc/75822
[26] See Marek, Thorne, Wang, DeWall, and Hornbuckle at https://pubs.acs.org/doi/10.1021/es304455k
[27] See Zhu, Mapuskar, Marek, Xu, Lehmler, Robertson, Hornbuckle, Spitz, and Aykin-Burns at https://doi.org/10.1093/toxsci/kft186
[28] See Koh, Hornbuckle, and Thorne at https://pubs.acs.org/doi/10.1021/acs.est.5b01854
[29] See Washington Departments of Ecology and Health at https://apps.ecology.wa.gov/publications/SummaryPages/1507002.html
[30] Id.
[31] See Washington State Departments of Ecology and Health at https://apps.ecology.wa.gov/publications/SummaryPages/1507002.html
[32] See Rodenburg, Guo, Du, and Cavallo at https://pubs.acs.org/doi/10.1021/es901155h
[33] See Washington Departments of Ecology and Health at https://apps.ecology.wa.gov/publications/SummaryPages/1507002.html
[34] Id.

percent) of the English Sole and Coho exceeded the criterion.[35] There are 158 bodies of water in Washington State that are significantly impacted by PCBs.[36]

Exposure to PCBs in the environment is a concern for sensitive species

Although lower weight PCBs such as PCB 11 are less bioaccumulative than other congeners,[37] paints and printing inks also contain higher molecular weight PCBs, which bioaccumulate in animals and increase in concentration higher in the food chain. The Southern Resident Orca Task Force noted PCBs as a chemical of concern and identified reducing exposure as one of their four Task Force recommendations for preserving orcas in Puget Sound.[38] PCB contamination reduces the health of aquatic organisms throughout the food chain, including forage fish, salmon, and orcas. In addition, a variety of harmful effects have been shown in birds and mammals, such as reduced egg or embryo viability and reduced live births.[39]

PCBs have been detected in many aquatic organisms at potentially harmful levels throughout Washington. Levels of PCBs associated with health impacts are observed in seals in the Strait of Georgia, and most Southern Resident Orcas exceed the health effects thresholds for PCB residues.[40, 41] PCBs are persistent chemicals, so once released in the environment, they can be challenging or impossible to remove, affecting wildlife for years to come. See Ecology's Chemical Action Plan for more details about effects on wildlife health.[42]

Currently the Washington State Department of Health advises human consumption restrictions for specific recreational fish in 14 freshwater bodies of the state due to the high levels of total PCBs measured in fish tissue. This includes the upper, middle, and lower Columbia River, the Spokane River, the Yakima River, the Wenatchee River, and Lake Washington.[43]

Paints and inks and other consumer products are a significant source of inadvertent PCBs

One notable source of inadvertent PCBs is from consumer products, specifically including paints and printing inks. PCBs are inadvertently generated during the manufacturing of chlorine-based pigments. This likely occurs mostly in the pigment ingredients used to make these products. However, other ingredients may contribute as well—especially if silicone components are used, as they have been

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[35] Id.
[36] Id.
[37] See Rodenburg and Delistraty at https://pubmed.ncbi.nlm.nih.gov/30771650/
[38] See Southern Resident Orca Task Force at https://www.governor.wa.gov/sites/default/files/OrcaTaskForce_reportandreco mmendations_11.16.18.pdf
[39] See Washington Departments of Ecology and Health at https://apps.ecology.wa.gov/publications/SummaryPages/1507002.html
[40] See Cullon, Yunker, Alleyne, Dangerfield, O'Neill, Whiticar, and Ross at https://doi.org/10.1897/08-125.1
[41] See Hickie, Ross, Macdonald, and Ford at https://doi.org/10.1021/es0702519
[42] See Washington Departments of Ecology and Health at https://apps.ecology.wa.gov/publications/SummaryPages/1507002.html
[43] See Washington Department of Health at https://doh.wa.gov/data-and-statistical-reports/washington-tracking-network-wtn/fish-advisories/fish-consumption-advisories-washington-state

identified as another source of inadvertent PCBs.[44] EPA requires reporting of inadvertent PCB generation, and pigment and dye manufacturing are the most reported processes that produce inadvertent PCBs. Through its work developing the PCB Chemical Action Plan and implementing the Safer Products for Washington program, Washington State estimated that pigment and dye manufacturing is the current product group contributing the most to PCB levels in the environment.[45]

Paints and printing inks vary widely in components depending on the intended use, but usually contain pigment or dye (to provide color), binder (to wet and disperse pigment), solvents (to dissolve binder and mix components), and excipients (which affect properties of ink). Paints and printing inks are the predominant use of pigments, using 50 percent or more of the total pigments manufactured, with uses including plastics and toiletries.[46, 47, 48]

Paint colorants have the potential to emit PCBs, which can increase in the environment to concentrations of more than 500 pg/m^3 within hours of application.[49] Thus, printing inks can also contribute to airborne PCB concentrations, especially in areas where printing is occurring. PCBs have also been detected in residential environments from indoor air and house dust.[50] A study reported concentrations of PCBs in indoor air in homes and schools in East Chicago, Indiana and Columbus Junction, Iowa and estimated exposures in mothers and their children. Inhalation exposure was greater in indoor environments than outdoor environments, and included contributions from PCB 11, which the authors attributed to pigments and paint. [51]

PCBs in pigments, paints, and inks make a significant contribution to exposure

People are exposed to PCBs in air, water, soil, and house dust. Humans can also be exposed to PCBs through direct contact with consumer products that use pigments[52, 53] as well as from the presence of PCBs in the environment.[54]

Biomonitoring studies for PCB congeners unique to dyes and pigments showed that 65 percent of 85 women in the Midwest studied had trace levels of PCB 11 in their blood.[55] Another study demonstrated that on average, about ten percent of the total PCBs detected in study participants came from non-Aroclor PCBs. This study also found that, on average, 50 percent (but up to 100 percent) of

[44] Id.
[45] Id.
[46] See ChemChain at http://blog.chemchain.com/2017/11/02/world-organic-pigment-market-and-china-market-report/
[47] See Mordor Intelligence at https://www.mordorintelligence.com/industry-reports/dyes-and-pigmentsmarket
[48] See Nestler, Heine, and Montgomery at https://srrttf.org/wp-content/uploads/2019/06/4b-SRRTTF_BriefonPaper_Revised.pdf
[49] See Jahnke and Hornbuckle at https://pubs.acs.org/doi/10.1021/acs.est.9b01087
[50] See Takeuchi, Anezaki, and Kojima at https://doi.org/10.1016/j.envpol.2017.04.059
[51] See Ampleman, Martinez, DeWall, Rawn, Hornbuckle, and Thorne at https://pubs.acs.org/doi/10.1021/es5048039
[52] See Guo, Capozzi, Kraeutler, and Rodenburg at https://pubs.acs.org/doi/10.1021/es502291b
[53] See Rodenburg, Guo, Du, and Cavallo at https://pubs.acs.org/doi/10.1021/es901155h
[54] See Vorkamp at https://doi.org/10.1016/j.scitotenv.2015.10.019
[55] See Marek, Thorne, Wang, DeWall, and Hornbuckle at https://pubs.acs.org/doi/10.1021/es304455k

non-Aroclor PCB concentrations in the participants were likely due to pigment exposure.[56] PCB 11 concentrations have not decreased since 2004, and in 2007, PCB 11 was found in 91 percent of air samples taken near 40 Chicago area elementary schools.[57]

PCB 11 is considered a hallmark of inadvertent PCB contamination, specifically from pigments and dyes, since it is known to be present in many painted and printed materials, and it is not found in legacy PCB products.[58] PCBs have been shown to leach from painted and printed materials when exposed to water.[59, 60] Pigments found in paints and inks are likely sources of PCBs detected in the environment.[61, 62, 63, 64, 65] They have been directly linked to wastewater discharges with PCB levels above water quality criteria in the City of Spokane, Washington.[66]

Limited data are available, but Washington State estimates that two paper recycling facilities in Washington discharge 28 grams of PCBs per year, with 3.8 grams being PCB 11, and that the Spokane River Wastewater Treatment Plant (WWTP) was discharging 71 grams of PCBs per year.[67] Product testing results suggest that pigments may account for the majority of PCB 11 detected in the environment, and thus almost certainly contribute other congeners as well.[68]

Exposure to PCBs is particularly relevant for infants, children, women of childbearing age, and indigenous populations

Although levels of PCBs in blood for young people have declined over the past three decades, there is still potential for exposure from products that contain these chemicals. Due to the presence of PCBs in consumer products, and their subsequent release into the air, dust, and food supply, there is potential for infants and young children to be exposed, especially since they have more contact with house dust.[69, 70, 71, 72] Infants are also exposed in utero and via nursing to PCBs that have accumulated in the mother's

[56] See Koh, Hornbuckle, and Thorne at https://pubs.acs.org/doi/10.1021/acs.est.5b01854
[57] See Hu, Martinez, and Hornbuckle at https://pubs.acs.org/doi/10.1021/es801823r
[58] See Heine and Trebilcock at https://srrttf.org/wp-content/uploads/2019/07/NGC-inadvertant-PCB-White-Paper-for-SRRTTF-20181016.pdf
[59] See George, In, Johnston, Kurtz, Seligman, Gauthier, and Wild at https://apps.dtic.mil/sti/citations/ADA452595
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[62] See Hu, Martinez, and Hornbuckle at https://pubs.acs.org/doi/10.1021/es801823r
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[68] See Guo, Capozzi, Kraeutler, and Rodenburg at https://pubs.acs.org/doi/10.1021/es502291b
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[70] See Rudel, Camann, Spengler, Korn, and Brody at https://pubs.acs.org/doi/10.1021/es0264596
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[72] See Takeuchi, Anezaki, and Kojima at https://doi.org/10.1016/j.envpol.2017.04.059

body over many years. For example, blood PCB levels increased after birth in breastfed infants and then decreased in early adolescence.[73]

A study from 2008–2010 analyzed blood levels in children and their mothers from 200 urban and rural U.S. communities for the presence of 209 PCBs, and found widespread detection of all congeners, including PCB 11. This study reported variability of all PCBs and major metabolites (the end-products of the chemical after it goes through metabolism in the body) in two generations of people, which suggests that short-term exposures to PCBs may be a significant component of what is measured in human blood.[74]

In Washington, local indigenous populations are at more risk from exposure to PCBs than other populations. These indigenous populations were surveyed in fish consumption studies, and they often eat more fish than other communities.[75] Exposure to PCBs has been linked to higher incidence of diabetes and cardiovascular disease in indigenous populations.[76] These findings have important health equity and environmental justice implications.

The National Tribal Toxics Council does not consider the 50 ppm allowance for inadvertent PCBs in pigments to be sufficiently protective of their population due to increased fish consumption. The Confederated Tribes of the Umatilla Indian Reservation has requested a lower tolerance level, specifically calling out inks and pigments.[77]

Availability of safer alternatives

Despite the prevalence of inadvertent PCBs in paints and inks, there are existing methods that can reduce—or, in the case of titanium dioxide, eliminate—the amount of inadvertent PCB content in pigments and dyes. In addition, inadvertent PCB production is not a problem for non-chlorinated pigments. Some organizations, including HP® and Apple®, have policies in place prohibiting the purchase of ingredients (including paints and inks) with PCBs over 0.1 ppm.[78]

Product testing has shown that paints and printed material with a wide variety of colors do not contain detectable levels of PCBs, indicating that low-PCB or PCB-free products are available.[79, 80] This is

[73] See CDC at https://stacks.cdc.gov/view/cdc/75822
[74] See Marek, Thorne, DeWall, and Hornbuckle at https://pubs.acs.org/doi/10.1021/es502490w
[75] See Washington State Department of Ecology Fish Consumption Rates at https://apps.ecology.wa.gov/publications/documents/1209058.pdf
[76] See Nestler, Heine, and Montgomery at https://srrttf.org/wp-content/uploads/2019/06/4b-SRRTTF_BriefonPaper_Revised.pdf
[77] Id.
[78] See Heine and Trebilcock at https://srrttf.org/wp-content/uploads/2019/07/NGC-inadvertant-PCB-White-Paper-for-SRRTTF-20181016.pdf
[79] See Washington Department of Ecology at https://fortress.wa.gov/ecy/publications/publications/1404035.pdf
[80] See Washington Departments of Ecology and Health at https://apps.ecology.wa.gov/publications/SummaryPages/1507002.html

supported by ChemForward's publicly available "Inadvertent PCB (IPCB) Pigment Resource" database, demonstrating the availability of chlorine-free pigments.[81]

Because non-PCB options exist and are readily available on the market, Washington State believes there is insufficient justification to allow continued use of processes that knowingly create PCBs in paints, inks, and pigments.

Conclusion

Washington State's residents and environment, including sensitive species, are being exposed to PCBs present in the consumer products they use every day. The scientific evidence demonstrates a variety of harms to both human health and the environment from PCBs, including toxicity, cancer, developmental toxicity, and endocrine disruption. The presence of inadvertent PCBs in consumer products is continuing to cause exposure and environmental contamination.

To address these concerns, Washington State requests that EPA take the actions detailed above and commence rulemaking as soon as possible to reduce human and environmental exposures to PCBs.

[81] Available at https://www.chemforward.org/ipcb-pigment-resource-tool#:~:text=The%20iPCB%20Pigments%20Resource%20is,the%20likelihood%20of%20containing%20iPCBs

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