American Coatings Association

Please see attached.

AmericanCoatings ASSOCIATION℠

January 28, 2022

Cheryl A. Niemi
Hazardous Waste and Toxics Reduction Program Manager
Washington Department of Ecology
300 Desmond Drive SE,
Lacey, WA 98503

Re: Department of Ecology's Draft Report to the Legislature, Washington Safer Consumer Product Program

Submitted via online portal at:
https://hwtr.ecology.commentinput.com/?id=HWQc5

Dear Mrs. Niemi:

American Coatings Association (ACA) appreciates Washington Department of Ecology (hereinafter "Ecology") maintaining open communication with stakeholders as it continues to develop the Safer Products for Washington Program. ACA is eager continue to work with Ecology towards implementing an effective program, based on a clear and accurate understanding of products causing contamination and their impact on health and the environment. ACA and its members appreciate the opportunity to provide comment on Ecology's *Draft Report to the Legislature* (hereinafter "Draft Report"), organized into the following sections:

I. Introduction
II. Ecology must identify contamination sources with a risk assessment to minimize significant sources of iPCB contamination.
   a) Ecology's estimated volumes of paint sold do not establish iPCB-content of paints on the market in Washington
   b) Paints are not likely to contribute to i-PCB contamination to waterways in the State of Washington
III. Federal, risk-based, concentration limits provide effective iPCB controls for paints
IV. Prior studies demonstrate that iPCB prohibition limits identified by Ecology are not feasible for some deep toned paints

V. The Ecological and Toxicological Association of Dyes and Organic Pigments Manufacturers' (ETAD) study provides additional considerations for setting iPCB limits
VI. Adequate supply of some pigments within the considered iPCB ranges are not available
VII. ACA requests an adequate compliance timeframe and sell-through period
VIII. ACA suggests modification of terminology to accurately describe scope of paint products while noting required exemptions
IX. Conclusion

I. Introduction

Ecology published a draft report to the legislature in November 2021, with the intention of finalizing the report for submission to the legislature by June 2022, as required by timelines stipulated in the *Washington Safer Consumer Products Act*, at RCW 70A.350.040. In the report, Ecology must, "determine regulatory actions to increase transparency and to reduce the use of priority chemicals in priority consumer products," as stipulated to in RCW 70A.350.040. That part further enumerates several regulatory options available to Ecology. These include:

- A determination that no action is necessary.
- Require manufacturers provide notice and other information to Ecology regarding use of a chemical and/or product.
- Restrict or prohibit manufacture, distribution, use, etc.

Ecology recommends regulatory action restricting PCBs in paint at p. 14 of the Draft Report. ACA looks forward to working with Ecology to provide further comment when Ecology determines a specific regulatory approach. In its report, Ecology references iPCB concentrations of 10 ppb and 25 ppb as operative in determining scope of products that could have an environmental impact.

With this report, Ecology summarizes its justifications for selection of priority products with PCBs, described as "categories of building paint for indoor and outdoor use, spray paint, children's paint, and road paint," since Ecology identified "safer and feasible" alternatives to PCBs for these products. Ecology further explains, "We identified insufficient data for other types of paint, so at this time, we are limiting our draft determination to the above paint types." (See p. 64, *Draft Report to the Legislature*, November 2021).

Ecology's justification for identifying inadvertent PCBs (hereinafter "iPCBs") in certain types of paints as a "significant source" of contamination rests on three factors:

- Identification of hazards of PCBs;
- A rough estimate of the amount of paint and coatings of all types sold in the United States, adjusted for the population of Washington, and
- Studies suggesting that colorants used in paint could form PCB-containing dust and/or cause leaching into waterways.

Ecology notes that the most prevalent source of PCB release into the environment is from "legacy" sources such as lamp ballasts. (See p. 59, *Draft Report*, November 2021).

ACA is deeply concerned by Ecology's speculative approach to identifying iPCBs in paint as a significant source of PCB contamination. As explained further below, studies recognized by EPA, the European Chemicals Agency and the Spokane River Task Force indicate contribution to PCB contamination from paint is minimal. Further, Ecology has not considered a totality of information available to it, including exposure potential and regulatory approaches of other jurisdictions, as required by the *Safer Products for Washington Act*. Proceeding with regulation of paint would not bring quantifiable environmental benefits, undermining the purpose of the act.

ACA recommends that Ecology modify its *Draft Report* to recommend no further regulatory action. In the alternative, ACA suggests adopting a colorant concentration of 5 ppm of iPCB's, as adjusted for paints. While we understand that Ecology must regulate at the consumer product level, iPCBs are found in pigments, then passed down to colorants and paints. Therefore, paint manufacturers must rely on their supply chain to provide compliant colorants such that end-use paint products are within specified limits. By adopting the 5 ppm limit in pigments, Ecology would achieve an 80% reduction from EPA's current limit of 25 ppm. Ecology would also be building on EPA's risk-based evaluation, where EPA considered a 5 ppm limit for products that could cause direct exposure. As manufacturers work to comply with Ecology's proposed level, it is likely that paints made for Washington will be sold nationwide, triggering a nation-wide reduction in any iPCBs present in paint.

II. Ecology must identify contamination sources with a risk assessment to minimize significant sources of iPCB contamination

As noted in ACA's prior comments, Ecology has not met its obligation to identify a "significant source" of PCB contamination. To clearly identify sources of PCB levels in waterways, ACA strongly suggests that Ecology conduct a source-to-receptor assessment. Absent an assessment, ACA is concerned that major sources, including legacy sources, are not being addressed as part of the Safer Consumer Products regulatory process, eviscerating any real protections to aquatic species and resulting in regulation that does not significantly reduce PCBs in the environment.

The criteria for selection of consumer products, provided in RCW 70A.350.030 requires Ecology to consider both exposure potential and potential for contamination in the environment, amongst several other considerations. Specifically, the section requires Ecology to consider:

> The potential for *exposure* to priority chemicals by sensitive populations or sensitive species when the consumer product is used, disposed of, or has decomposed; and
>
> (RCW 70A.350.030(2)(c))

> The potential for priority chemicals to be found in the outdoor environment, with priority given to surface water, groundwater, marine waters, sediments, and other ecologically sensitive areas, *when the consumer product is used, disposed of, or has decomposed.*
>
> (RCW 70A.350.030(2)(d)

Ecology has not identified actual release or exposure to PCBs caused by paint types identified in Ecology's Draft Report. Ecology's approach undermines the purpose of the statute articulated in the preamble to the act as, "preventing toxic pollution that affects public health or the environment."[1] By failing to identify the largest contributors of PCB contamination, Ecology minimizes potential benefits of the program, undermining its legislative purpose.

Under that same section, Ecology must consider the feasibility and availability of alternatives, estimated volumes of the priority chemical in priority products, volumes of priority product sold in the state and regulatory actions in other jurisdictions and by the agency. Ecology must consider these factors in their entirety, including exposure-related considerations. Ecology has not fulfilled its statutory obligation by selecting a product with any level of a priority chemical and/or low exposure potential. ACA is concerned that identifying paints as a priority product will not address PCB contamination at issue while imposing a high cost to the paint industry.

a) Ecology's estimated volumes of paint sold do not establish PCB-content of paints on the market in Washington.

ACA is concerned that Ecology has not adequately identified amounts of paints on the market in Washington with levels of inadvertent PCBs of concern, that could affect flora and fauna. At p. 65 of the *Draft Report*, Ecology estimates a volume of paint sold in Washington, based on the total volume sold in the United States adjusted for the population of Washington. This estimate could potentially be very far from actual volumes sold in Washington. More concerning however, the estimate is based on the total volume of paints and coatings of all types that are sold in the United States, a majority of which have little to no PCB content or PCB content well below identified levels of concern.

At p. 62-63 of the *Draft Report*, Ecology explains that iPCBs are an inadvertent by-product of manufacture of some pigments. Not all paints have iPCBs. Affected pigments are diarylide yellows and phthalocyanines, used to formulate certain deep-toned green and yellow paints. Ecology also identifies titanium dioxide, although to ACA's knowledge, titanium dioxide is not a contributor to iPCB content.

Ecology's general estimates of volumes of paint sold in Washington do not adequately reflect volumes of paint with iPCB levels of concern. Ecology indicates it must rely on estimated volume of paint sold since volumes of pigment sales are presumably very low in the state. (See

[1] Substitute Senate Bill 5135 ("Safer Products for Washington Act"), 2019 Legislative Session, available online at: http://lawfilesext.leg.wa.gov/biennium/2019-20/Pdf/Bills/Session%20Laws/Senate/5135-S.SL.pdf.

p. 62, *Draft Report*). Although sales of pigment as a raw material may be low in the state, Ecology must evaluate actual volume of paint sold in the state with iPCB levels of concern. ACA is deeply concerned that proceeding without further analysis will lead to an inaccurate understanding of the scope of impacted products and feasibility of a regulatory approach.

Data referenced in the *Draft Report* indicates that volumes of paint sold in the state with iPCB levels of concern are likely very low. Ecology identifies, paint for buildings, children's paint, spray paint and road paint as likely containing iPCB's at levels of concern. Ecology notes that of its sample of 108 paints of these types, 89% had concentrations under 25 ppb and 78% had concentrations under 10 ppb, where 10 ppb and 25 ppb are Ecology's threshold iPCB levels for environmental concerns. (See p. 64, *Draft Report*). In effect, 11 % contained iPCB's at 25 ppb or greater and 22% contained 10 ppb or greater.

According to Ecology's data, proceeding with regulation will have minimum to no impact at such low percentages of products with iPCB levels of concern. The problem is compounded since Ecology has not identified an actual volume of paints within the defined paint product scope being sold into the state. The actual amount of affected paints sold in the state could be very low, but the cost to industry to identify paints with relevant pigment and to reformulate would be disproportionately high.

The testing results for iPCBs in paints and coatings documented by Ecology confirm that levels are well within North American and Global regulatory standards deemed safe by federal agencies and international authorities. When identifying a priority product, the Safer Products for Washington Act requires that Ecology consider these regulatory approaches. (See RCW 70A.350.030). Ideally, when selecting a priority product, Ecology must provide some rationale related to inadequacy of current regulatory approach. Here, Ecology has not provided information related to the need for a specific iPCB level, other than indicating that 11% of relevant paints and coatings have an iPCB concentration of 25 ppb or more and 22% have a concentration of 10 ppb or more. Even these outlying percentages are well below federally mandated requirements. Without further new studies by Ecology, one must assume that all paints and coatings currently sold in Washington State are "safe" and do not present a hazard to consumers.

b) Paints are not likely to contribute to iPCB contamination to waterways in the State of Washington

A study conducted by the State of Washington indicates that the most common iPCB in paints and coatings, PCB-11, is not detected in fish. At the June 30, 2021 meeting of the Spokane River Regional Toxics Task Force (SRRTTF) Positive Matrix Factorization (PMF) Workgroup Meeting, Dr. Lisa Rotenburg presented conclusions based on review of all available data relevant to fish tissue and biofilm from the Spokane River. Dr. Rotenburg concluded that PCB-11 is frequently

below the detection limit in the fish samples and that PCBs in fish tissue are almost entirely from legacy aroclors / PCBs once used in electronics and related components.[2]

Another report specific to the State of Washington emphasizes the need for further data related to sources of PCB contamination and their possible impact on wildlife. The report, issued by the Southern Orca Resident Task Force in November 2019,[3] notes recent losses of three adult orca from the Southern Resident population, leaving only 73 orcas. To reverse this trend, the task force made 49 recommendations. Of these, five related to contamination, mostly related to further data gathering and addressing legacy contamination as a main contributor. PCB is included as a contaminant. A majority of recommendations address other issues affecting the Orca population, such as climate change, recovery efforts, impact of human population, etc. In advocating for reduction of PCBs in products, the task force recommends reducing, "PCBs entering Puget Sound from products such as paints, hatchery fish feed, adhesives, electrical equipment, caulking, paper products and lubricants." The task force does not quantify a causal connection between PCB contamination and the presence of PCBs by type of product. Without a clear connection between PCB sources and environmental concentration, proceeding to restrict paints containing pigments - one potential source out of many - is likely to provide no reduction in PCB concentration in waterways.

In its *Draft Report*, Ecology cites several studies demonstrating leaching of PCBs from painted materials to conclude paints are likely sources of PCBs in the environment.[4] The studies do not relate to paint applied as end-use products. Rather, the studies evaluate potential for leaching in a raw material of paint, the colorant additive. Any potential for leaching, would be mitigated by dilution of the colorant in an end-use paint product. More information is needed about the leaching potential and related impact on flora and fauna.

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[2] Slides from Dr. Rotenburg's presentation are available on the website of the Spokane River Task Force at: PCB sources to WWTPs in the Spokane River Basin (srrttf.org).

[3] The Southern Orca Resident Task Force is an inter-governmental and NGO task force appointed by the Governor to develop plans for orca recovery and future sustainability. Its most recent recommendations are published in: Southern Orca Resident Task Force, 2019. Final report and recommendations. (November 7, 2019). More information about the task force and reports are available online at: https://www.governor.wa.gov/issues/issues/energy-environment/southern-resident-orca-recovery/task-force

[4] At p. 65 of the *Draft Report to the Legislature*, Ecology refers to:

- EPA, 2015a;
- George et al., 2006;
- Guo et al., 2014.
- Andersson et al., 2004;
- Hu et al., 2011;
- Jartun et al., 2009a, 2009b;
- Johnston et al., 2006;
- Ruuset al., 2006.

Complete citations are available at p. 173, App. B, *Draft Report to the Legislature*

III. Federal, risk-based, concentration limits provide effective iPCB controls for paints

U.S. EPA has established a national PCB limit for consumer products at an annual average of 25 ppm with a 50 ppm maximum. EPA also provides guidance related to quantifying amounts to evaluate compliance while allowing for some variance. Concentration is calculated following division of the quantity of monochlorinated biphenyls by 50 and dichlorinated biphenyls by 5.

As stated above, ACA strongly recommends that Ecology *not* proceed with regulatory action for paints, due to the lack of data demonstrating environmental benefits from regulating iPCBs in paints. However, if Ecology insists on regulating PCBs in paints, ACA suggests adopting a pigment iPCB concentration of 5 ppm. ACA can provide additional information converting the pigment limit into an iPCB limit for paint. While we understand that Ecology must regulate at the consumer product level, iPCBs are found in colorants, containing pigment, and therefore, paint manufacturers must rely on their supply chain to provide colorants with compliant pigments. With this approach, Ecology would achieve an 80% reduction from EPA's current limit of 25 ppm. It should also be noted that a large percentage of paint will have iPCB concentrations well below the comparable level in paints to the 5 ppm prohibition level in pigments, since most consumers purchase mid-tone or pastel colors that do not require deep toned pigments containing relatively higher concentrations of iPCB's.

By adopting a 5 ppm pigment limit, Ecology would build on EPA's risk-based evaluation, where EPA considered a 5 ppm limit for products that could cause direct exposure. As manufacturers work to comply with Ecology's proposed level, it is likely that paints made for Washington will be sold nationwide, triggering a nationwide reduction in any iPCBs that may be present in paints.

At a level of 5 ppm iPCB concentration in pigments, Ecology would achieve an 80% reduction from the current EPA limit of 25 ppm. A large percentage of paints already have iPCB concentrations well below the iPCB concentration for paints with pigments meeting the 5 ppm pigment limit. This low level is achieved since most consumers purchase mid-tone or pastel colors using less pigment than a deep toned color. Only the deep toned colors may be of a concern, requiring greater pigmentation.

In a webinar in June 2021, Ecology indicated that it was considering concentration limits for iPCBs found in certain paints based on a range of observed concentrations. At p. 63 of its *Draft Report*, Ecology used 10 ppb and 25 ppb as thresholds for measuring significant concentrations of PCB in types of paint. Although Ecology has not clearly specified a regulatory concentration threshold, Ecology has stated it would identify a reasonable threshold based on concentrations identified in Ecology's survey of paints. Ecology has stated it will also consider industry's ability to implement any limits.

Ecology's suggested approach considers elimination of the presence of PCB's without meaningful analysis of operative concentration limits that would impact flora and fauna. As

noted above, without a risk-based approach, Ecology is proceeding without data needed to tailor an effective regulatory program as envisioned by the statute.

When identifying a priority product, the *Safer Products for Washington Act* requires that Ecology consider regulatory approaches in other jurisdiction, presumably to evaluate the need for additional regulation. (See RCW 70A.350.030). Ecology must consider risk-based limits on iPCBs in products established by the U.S. EPA, established after review and analysis of several paint pigments. Any deviation from EPA standards must be based on a clearly articulated, risk-based need for variations at the state level.

The U.S. Food and Drug Administration (FDA) has also set a risk-based limit for PCBs in food and packaging, based on evaluation of potential effect on human health. Ecology's reference levels of 10 ppb and 25 ppb would regulate iPCBs in paint to levels many fold lower than those allowed for direct ingestion in food. As such, adoption as a regulatory value is unnecessary and unfounded. For paper packaging in direct contact with food, FDA set a PCB tolerance of 10 ppm, after conducting a risk-based analysis. FDA also set temporary food tolerances for PCBs ranging from 0.2 to 1.5 ppm (21 Code of Federal Regulations 109.30(a)). FDA recognizes that PCBs are ubiquitous at minute levels throughout the environment.

EPA also evaluated paint pigments under its Safer Choice[5] ingredients list program, providing an available reference for Ecology. ACA suggests that Ecology refer to risk-based criteria of the Safer Choice Program to inform Ecology's method of identifying risk of pigments, while also considering EPA's conclusions. Of the 45 colorants EPA reviewed, EPA designated the following ratings for paint pigments:

- Green circle (low concern)
    - C.I. Pigment Blue 15
    - C.I. Pigment Green 7
- Green half-circle (low concern, additional data would strengthen confidence)
    - Copper phthalocyanine, sulfamoyl sulfo derivs., sodium salts
- Yellow triangle (met criteria but has some hazard profile issues)
    - None
- Grey square (not acceptable for Safer Choice label)
    - None

[5] https://www.epa.gov/saferchoice/safer-ingredients

IV. Prior studies demonstrate that iPCB prohibition limits identified by Ecology are not feasible for some deep toned paints

In its report, Ecology concludes that paint can be formulated to iPCB levels of 10 and 25 ppb, therefore alternatives are "feasible." Ecology reaches this conclusion by reviewing a survey of iPCB data for 105 paint and colorant samples. For architectural or "building paint," Ecology's survey and analysis does not differentiate deep-toned green and yellow paints, where the highest iPCB concentrations would be found. These colors require greater pigment content, increasing the concentration of iPCB's. That is, if the samples included in Ecology's evaluation are mostly medium toned and pastel toned colors, most samples will be below the 10 ppb and 25 ppb thresholds because significantly less colorant is used to tint these paints. This is reflected in Ecology's results, noting 89% have concentrations below 25 ppb and 78% have concentrations under 10 ppb. These limits are "feasible" for lighter tones, but not deep-tones. To gain a deeper understanding of feasibility, Ecology must broaden its sample size and evaluate deep-toned colors used in architectural paints. Ecology's sample and analysis are at p. 62-64 of the *Draft Report*.

In Supplement 2, discussed at p. 63 of the *Draft Report*, Ecology surveys green and yellow paint, without differentiating deep-tones. Ecology reports testing 20 "green paints and diluted colorants," and 35 "yellow paints," concluding that:

- 60% of green samples and diluted colorants are below 10 ppb of iPCBs.
- 75% of green samples and diluted colorants are below 25 ppb of iPCBs.
- 71% of yellow samples are under 10 ppb of iPCBs.
- 86% of yellow samples are under 25 ppb of iPCBs.

This survey is not informative towards a true feasible limit for deep-toned paints, since it does not differentiate saturated, darker yellows and greens. No two greens or two yellows are alike. Ecology must analyze different tones of paints as if they are different colors, and indeed from the perspective of paint manufacturers, shades and tones are different colors with different formulations and aesthetic effects upon application. A "feasible" iPCB concentration for a pastel green is not a reasonable value for a rich, verdant green paint.

Ecology should also be aware that paint formulas for any given color can vary, leading to significant variations in colorant content and iPCB concentrations. For example, paint manufacturers may use yellow and green colorants to formulate a deep toned green paint. The iPCB content would vary significantly from a paint using a green colorant. Ecology does not disclosed formula of samples analyzed. Results indicate a very restricted sample size, with limited or no variations of formulas, especially for deep-toned paints of greatest concern for iPCB content. The results for deep-toned paints are likely highly inaccurate.

ACC is also concerned about the accuracy of testing and sampling methods used when arriving at the 10 ppb and 25 ppb thresholds. Ecology used Method 1668 to analyze samples, as noted at p. 16 of Ecology's July 2021 revision of its *Quality Assurance Project Plan (Publication No. 13-04-008).* The paint and coatings industry considers this to be an unreliable test method. Ecology's *Quality Assurance Project Plan* indicates that it accepted data with a broad margin of error. The approach is not within an acceptable margin of error for measuring trace levels at issue here. The results of this study are not reliable and cannot be replicated. **If Ecology were to determine a viable iPCB limit, to identify a viable test method and maintain uniform application of any iPCB limits, Ecology should recommend Method 8082A, as recommended by EPA.**

ETAD (the Ecological and Toxicological Association of Dyes and Organic Pigment Manufacturers) developed data regarding the presence of iPCBs in pigments, within the context of evaluating EU Regulation 2019/1021 ("the POP's Recast Regulation"), providing a ready reference for Ecology, based on a broader survey of paint products than that presented by Ecology at p. 64 of its *Draft Report*. Further, the *Safer Consumer Products Act*, at RCW 70A.350.030, suggests that Ecology consider relevant data of other jurisdictions by mandating Ecology, "If another state or nation has identified or taken regulatory action to restrict or otherwise regulate the priority chemical in the consumer product." ETAD sets a floor of 2 ppm as a starting point for discussions about a feasible concentration.

Table 1 of the ETAD position paper provides a summary of pigment iPCB testing in Europe, demonstrating pigment levels well above the 10 ppb and 25 ppb the Ecology identified for paint products where pigments containing iPCB's are necessary for desired color effects. Relevant data from Table 1 is summarized as follows:

- C.I. Pigment Yellow 83 pigment - 0.5 to 15 ppm (iPCB concentration).
- C.I. Pigment Green 7 and 36 - 1-3 ppm.
- C.I. Pigment Yellow 83 (assuming 30% pigment loading in colorants and 14% colorant loading for

deep tone paints) – 21-630 ppb for deep tones and 42-126 ppb for greens.

Broader sample size in the ETAD study indicates that Ecology's sample data did not include many of the deep toned colors, requiring greater pigmentation. Coating manufacturers cannot reasonably assure compliance with the 10 ppb or 25 ppb prohibition levels, especially for deep tone colors of architectural paints. The issue is compounded by a lack of supply of possible alternative pigments and unreliability of test methods for iPCB concentrations.

V. The Ecological and Toxicological Association of Dyes and Organic Pigments Manufacturers' (ETAD) study provides additional considerations for setting iPCB limits

ACA encourages Ecology to carefully consider conclusions and data in the ETAD study, referenced in the section above. A copy of the ETAD study is attached at the end of this comment. As noted above, Ecology's consideration would advance a mandate of the statute when evaluating priority products. ACA notes the following key points from the document:

- The Position Paper demonstrates that ETAD members comply with both EU and global PCB regulations.
- The position paper emphasizes to ECHA authorities that any discussion about changing existing PCB limits to a lower level BEGINS at a floor of 2 ppm. Discussion about future regulatory changes consider limits in the range of 2 ppm to 25 ppm, as a feasible limit.
- Even with appropriate manufacturing technology and pristine raw materials, "zero PCB" is not achievable and/or impossible for organic pigments.
- Further problems are expected regarding the supply of pigments, should the limit be changed suddenly, and ETAD doubts whether there would be enough lower iPCB-suitable pigments to fulfill demand from downstream paint formulators.
- In addition to PCB content, pigment products must satisfy many other requirements, many of which are influenced by shape, surface, crystal structure (polymorph), and particle size of the product.
- Significant resources, time and expertise are required to phase-out a pigment. Changes and developments in formulation are required at all levels of the supply chain. Broad-scale industry changes require investment in new organic pigment production facilities, reformulation by paint manufacturers and acceptance by the end user, based on performance, durability, aesthetic desirability, etc. Desired characteristics of the end product can vary greatly based on function driven by business to business specifications as well as consumer requirements.

VI. Adequate supply of some pigments within the considered iPCB ranges are not available

RCW 70A.350 requires that Ecology determine that safer alternatives are "feasible and available" before restricting the use of a priority chemical. At the PCB limits Ecology identified (10 ppb and 25 ppb), supply of dry pigments will be unduly strained and largely unavailable. ACA anticipates dry pigment shortages particularly for green and yellow pigments that meet suggested limits. Replacements are not known for some pigments.

For green pigments, it appears that only one phthalo-green pigment supplier is currently capable of meeting Ecology's suggested limits. One supplier would not be able to supply the entire paint manufacturing community without shortages as well as increased costs.

For yellow pigments, the industry primarily uses C.I. Pigment Yellow 83 (PY 83), which does not meet Ecology's suggested limits. Comparable replacement pigments have not been identified. Manufacturers would need to replace this pigment with a proximate replacement, resulting in a shift in the color space that would require reformulation of all paint formulas and downstream products that contained PY 83. Reformulation also results in some waste due to marketing materials that must be disposed of and replaced and disposal of outdated paint products.

Colorant manufacturers estimate three years to develop an alternative to PY-83, perform performance testing (including extended exposure testing) and gain required approvals for a PY-83-free colorant. Paint manufacturers require another 2 years to reformulate.

The coatings industry has already been facing increased raw material (including pigment) costs and supply shortages for several years. Several years ago, an explosion in China limited pigment supplies and recent demand and domestic supply shortages have increased global pigment costs. The suggested iPCB limits for paints will result in additional increased costs and supply shortages if Ecology implements the suggested iPCB limits.

Costs associated with limits in pigment supply and development of new pigments will be passed on to consumers. Paint manufacturers can expect to have significantly higher costs from reformulation across thousands of paint formulas, changing marketing and other related materials, and increased colorant raw material costs. Raw material suppliers and paint manufacturers anticipate compliance costs amounting to hundreds of thousands to millions of dollars per company, increasing prices passed onto consumers in the State of Washington.

VII. ACA requests an adequate compliance timeframe and sell-through period

Assuming the viability of reformulating, ACA requests a compliance date at least 5 years from the legislatively mandated effective date of June 1, 2024. Colorant manufacturers would need approximately three years to develop yellow pigment alternatives. This would include time to conduct performance tests, including extended exposure testing, and gain approval for alternatives. Manufactures must also secure adequate supplies of low iPCB green colorants during this three-year period. Paint manufacturers would require a subsequent two-year period to reformulate.

ACA also requests an unlimited sell-through of product manufactured prior to the compliance date, set five years after the effective date. Absent unlimited sell-through, ACA is concerned that extensive stocks will be "stranded" products, requiring disposal and contributing to waste. ACA's request is reasonable under requirements of the act. At RCW 70A.350.040(5), the act requires that,

> "A restriction or prohibition on a priority chemical in a consumer product may include exemptions or exceptions, including exemptions to address existing stock of a product in commerce at the time that a restriction takes effect."

Moreover, immediate implementation of the lower limit is not necessary to address an urgent environmental concern. As noted above, iPCBs from pigments in paints are not a primary source of contamination. An unlimited sell-through would not affect PCBs in waterways.

VIII. ACA suggests modification of terminology to accurately describe scope of paint products while noting required exemptions

ACA suggests a change in how Ecology refers to paint products. This change would more clearly describe the scope of products covered by the program. ACA further notes that Ecology must exempt DOD and FAA-regulated paints (including spray paints and road/runway paints).

a) Interior and Exterior Decorative Paints

ACA suggests replacing "building paint for indoor and outdoor use" with "interior and exterior decorative paint" since this better defines paints that contain color pigments that were tested and described in the paint test results in the *Draft Report*.

b) Description of scope

At p. 65 of the Draft Report, Ecology limits the scope of its conclusions to, "building paint for indoor and outdoor use, spray paint, children's paint, and road paint . . ." The description of scope in the heading titled *Scope of priority products* at p. 62 varies significantly. Ecology states "Paints sold in any form or packaging for personal, commercial, or industrial use are included."

Based on this description, ACA is concerned that any regulatory action may be overly broad, and not restricted to the four types of paints identified by Ecology. ACA recommends amending the language under the heading, *Scope of priority products* to clarify that EPA is limiting scope of any regulatory action to identified categories, currently described as, "building paint for indoor and outdoor use, spray paint, children's paint, and road paint."

c) Exemption for Paints and Coatings Certified or Regulated by the Federal Aviation Administration or Department of Defense, On-highway or Off-highway Vehicles, and Electronic Products

RCW 70A.350.030 specifically excludes Ecology from identifying the following as priority consumer products:

- Finished products certified or regulated by the Federal Aviation Administration (FAA) or the Department of Defense (DOD), or both, when used in a manner that was certified or regulated by such agencies, including parts, materials, and processes when used to manufacture or maintain such regulated or certified finished products.

- Motorized vehicles, including on- and off-highway vehicles, such as all-terrain vehicles, motorcycles, side-by-side vehicles, farm equipment, and personal assistive mobility devices.
- Restrict or require the disclosure of a priority chemical in an inaccessible electronic component of an electronic product.

This section indicates several important exclusions for any restriction on iPCB's in paint. ACA suggests that:

- Ecology exempt any paints that are certified or regulated by the Federal Aviation Administration or Department of Defense;
- Ecology exempt paint used to manufacture or maintain or refinish on-highway or off-highway vehicles (including automobile, construction equipment, all-terrain vehicles, motorcycles, side-by-side vehicles, farm equipment, and personal assistive mobility devices); and
- Ecology exempt paint used on an inaccessible electronic component of an electronic product or that are used in the production of electronic products or FAA and/or DOD road/runway paints.

IX. Conclusion

ACA strongly suggests that Ecology recommend no further regulatory action in its final report to the legislature, as authorized at RCW 70A.350.040, while noting that:

- iPCBs in paints are already regulated and have been evaluated by the federal government;
- Studies have not established a connection between trace levels of iPCBs in paint and iPCB contamination in the environment and aquatic species, particularly in orca; and
- Any further actions on PCBs should focus on the remediation of legacy contamination rather than products that do not meaningfully contribute to contamination.

Should Ecology decide to proceed with a regulatory approach, ACA recommends the following:

- Ecology conduct further exposure-based assessment to identify significant sources of PCB contamination.
- If paints are shown to have exposure potential, Ecology must conduct further market analysis to identify paints sold in the state with iPCB levels of concern.
- Ecology should adopt the 5 ppm limit considered by EPA as the iPCB limit in pigments. ACA can provide additional information to adjust this limit in pigments to a value for paints.
- Ecology should specify Method 8082A as the preferred method of detection.
- Ecology must reevaluate its suggested iPCB concentrations of 10 ppb and 25 ppb by broadening sample size to evaluate iPCB concentration by paint tones, e.g., deep-toned colors, medium toned and light-toned or pastels, for architectural paints.

- Regulatory values of 10 ppb or 25 ppb are unnecessary for environmental protection and are not founded in sound science, as indicated in EPA's evaluation of iPCBs, FDAs evaluation of PCBs and EPAs Safer Consumer Products Program evaluation of pigments containing PCBs.
- Pigments currently are not available in adequate supply or they do not exist to meet limits of 10 ppb and 25 ppb for certain colors.
- Ecology must consider survey information from ETAD indicating that discussion of iPCB limits should start at a floor of 2 ppm.
- Ecology should set a compliance date five years after the effective date of June 1, 2024.
- Ecology should allow an unlimited sell-through of products manufactured prior to the compliance date.

ACA also recommends the following editorial changes:

- ACA suggests replacing "building paint for indoor and outdoor use" with "interior and exterior decorative paint."
- ACA suggests clarification in the *Draft Report* section titled *Scope of priority products* at p. 62 by explaining scope is limited to four types of paint as specified.
- ACA suggests noting the current exemption in RCW 70A.350.030, providing an exemption for paints and coatings certified or regulated by the Federal Aviation Administration or Department of Defense, on-highway or off-highway vehicles, and electronic Products

ACA appreciates Ecology's willingness to consider stakeholders' comments as it implements the *Safer Consumer Products for Washington Act*. We also appreciate the previous meetings we have had with Ecology to discuss our concerns. We look forward to meeting with you again prior to any draft rulemaking affecting paints and Ecology's planned January 2023 public meeting. In the meantime, please feel free to contact me if I can provide any additional information.

Sincerely,
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ETAD Position on the Presence of Unintentional Trace PCBs in Some Organic Pigments in the Context Regulation (EU) 2019/1021 (POPs recast Regulation) [June 15th 2021]

Executive Summary

Polychlorinated biphenyls (hereafter: PCBs) are chemicals of global concern due to their potential for long range transport, persistence in the environment, ability to bio-magnify and bioaccumulate in ecosystems, and are toxic. Under the Stockholm Convention, their intentional manufacture, trade and use are banned globally. They are subject to release reduction provisions and waste consisting of or containing this substance is subject to specific provisions.

There is a growing amount of literature implying that the use of certain organic pigments may be dispersing PCBs throughout the environment,

Within the Stockholm Convention on Persistent Organic Pollutants (POP) the BAT/BEP Expert Meeting has also identified organic pigments as a source of unintentional POPs formation and release and pointed to the need for thorough identification and descriptions of the raw materials and technologies used in manufacturing processes, because these factors may greatly influence POPs formation and release.

Over the years ETAD member companies have carried out regular testing on their products placed on the market to ensure compliance with EU and global regulations. Our long-term Member Companies were asked to submit a random selection of their PCB historical testing results. Data was requested not only for pigments where PCBs could be present but specifically for the large volume pigments: C.I. Pigment Yellow 13, Monoazo pigments such as CI Pigment Red 57:1 and for Copper Phthalocyanines.

In this position paper we share our testing data, so that an open and informed discussion on the PCB/POPs issue can take place. This note also shows the data obtained in the (Japanese) METI study which are publicly available.

Without exception, the products placed on the market by the ETAD member companies have PCB contents less than 50 ppm, the limit given in Council Directive 89/677/EEC.

The data shows also that "zero PCB" is not attainable when chlorine atoms are present as part of the chromophore, present in a raw material or present in some form in the production process e.g as part of a solvent. Some brief consideration is given to some of the concerns that may arise when substituting a PCB containing pigment with a "zero PCB" pigment.

A proposal is made on the limit of unintentional trace PCB in organic pigments, along with a recommendation of test method specifically designed for organic pigments.

1. Introduction

PCBs are chemicals of global concern due to their potential for long range transport, persistence in the environment, ability to biomagnify and bioaccumulate in ecosystems, and affect human health. Their intentional manufacture, trade and use are banned globally.

In July 2011, ETAD published a position paper on the presence of inadvertent traces of PCBs in some organic pigments[1]. The Regulatory landscape was reviewed, and we confirmed that products placed on the market at that time by its member companies met the laws of the countries in which they marketed their products.

The Regulatory landscape has changed since then, e.g. within the EU Regulation (EU) 2019/1021)[2] (hereafter: POPs recast Regulation) was published. Additionally, there is a growing amount of literature[3] implying that the use of organic pigments may be dispersing PCBs throughout the environment, by manufacture, use or decay as part of waste. A study published in 2013 by the Japanese Ministry of Economy, Trade and Industry (hereafter: METI) lists a number of azo pigments with PCB concentrations above the Japanese, the EU (Council Directive 89/677/EEC[4] Art.1, par.1) and pre-2017 German 50 ppm limits, or the USA 40 CFR §761[5] limit of 25 ppm.

Within the Stockholm Convention[6] on Persistent Organic Pollutants, the Expert Meeting on Best Available Techniques and Best Environmental Practices held in Bratislava in 2015[7] has also identified organic pigments as a source of unintentional POPs formation and release and pointed to the need for thorough identification and descriptions of the raw materials and technologies used in manufacturing processes, because these factors may greatly influence POPs formation and release.

ETAD[8] is an international organization representing the dye and pigment industries committed to minimizing any adverse impact of organic colorants on health and the environment. Over the years ETAD members companies have carried out regular analyses on their products placed on the market. Further, ETAD and its member companies have been developing analytical methods on PCBs with respect to pigment peculiarities, e.g. ETAD Method No 229[9]. This method has subsequently been adopted as ISO 787-28:2019[10]a, and DIN EN ISO 787-28:2020-12[10]b. The adoption by CEN as EN ISO 787-28 is on the way.

Our long-term member companies were asked to submit a random selection of their PCB historical test results. Data was requested not only for pigments where PCBs could be present but specifically for the large volume pigments such as Pigment Yellow 13, Pigment Red 57:1 and for Copper Phthalocyanines. It is time both to update our earlier position paper and to share our test data, so that an open and informed discussion on this issue as well as on regulatory developments can take place.

2. ETAD Testing Data on PCBs

The PCB values shown in Table 1 are simply the summation of the individual test values of total PCBs. No exemptions (see Appendix I: EU Regulations) and no discounting factors for monochlorinated biphenyls and dechlorinated biphenyls (see Appendix I: USA legislation) have been used, and no adjustments for molecular weight (See Appendix I: CoE "AP(89)1").

Where several data sets for a specific pigment have been received, the values shown are simply the lowest and the highest and, in all likelihood, come from different member companies.

3. Discussion

Not every pigment shown in Table 1 is marketed by every ETAD member. These single data sets are indicated in the table.

For any one individual C.I. Generic name, the results are all similar, even though manufactured by different companies, and the analyses were carried out by differing institutions. They do not vary over orders of magnitude.

The data confirm that the values are lower than EU 50 ppm PCB limit set in the Council Directive 89/677/EEC. However, this Directive is no longer in force. It was repealed by Regulation (EC) No 1907/2006[11] (hereafter: REACH Regulation).

Table 1 Summary of PCB testing data generated by ETAD long-term member companies[1] as part of their monitoring program to ensure EU and global regulatory compliance.
(Data comes from testing of production material in the years 2013 to 2020)

C.I. Colour Index	Chemistry	Measured value of Total PCB (ppm)
Pigment Yellow 12	Diarylide	2.0 – 6.0
Pigment Yellow 13	Diarylide	< 0.5 - 10
Pigment Yellow 14	Diarylide	< 10
Pigment Yellow 17	Diarylide	0.5 to 8.0
Pigment Yellow 81	Diarylide	25 – 35
Pigment Yellow 83	Diarylide	0.5 - 15
Pigment Yellow 93	Disazocondensation	< 0.5
Pigment Yellow 95	Disazocondensation	< 0.5
Pigment Yellow 109	Isoindolinone	< 0.5
Pigment Yellow 110	Isoindolinone	< 1.0
Pigment Yellow 128	Disazocondensation	< 0.5
Pigment Yellow 168	Azo salt (Ca)	< 0.5
Pigment Yellow 183	Azo salt (Ca)	< 0.5
Pigment Yellow 191:1	Azo salt (Ca)	< 0.5
Pigment Orange 13	Diarylide Pyrazalone	0.5 - 5
Pigment Orange 34	Diarylide Pyrazalone	3.0 - 15
Pigment Orange 61	Isoindolinone	< 0.5
Pigment Red 2	Naphthol AS	10 - 20
Pigment Red 48:4	2B Toner (Mn) (azo lake)	< 0.5
Pigment Red 57:1[2]	Ca 4B Toner (azo lake)	Not detected
Pigment Red 112	Naphthol-AS	10 – 25
Pigment Red 144	Disazocondensation	< 10
Pigment Red 166	Disazocondensation	< 10
Pigment Red 202	Quinacridone	< 0.5
Pigment Red 214	Disazocondensation	< 10
Pigment Red 220	Disazocondensation	< 0.5
Pigment Red 221	Disazocondensation	< 0.5
Pigment Red 254	DPP	< 1 - 10
Pigment Red 264	DPP	< 0.5
Pigment Violet 19	Quinacridone	< 0.5
Pigment Violet 23	Dioxazine	<2.0
Pigment Blue 15; 15:1 -15:6	Phthalocyanines, different treatment and polymorphs	< 0.5
Pigment Brown 23	Disazocondensation	< 10
Pigment Green 7	Phthalocyanine chlorinated	< 3.0
Pigment Green 36	Phthalocyanine mixed halogenated (Br,Cl)	< 1.0

1) This table, a non-exhaustive list, shows the testing data received from our ETAD long-term member companies and is not to be taken as a guarantee of controlled values of ETAD member companies. All values are the simple summation of the individual analytical values for each of the congener groups including mono- and di-chlorinated biphenyls.
2) No chlorine in the molecule and no chlorinated solvents used in its manufacture. It was included in the data gathering as it is a large volume pigment (REACH phase 1)

Annex XVII to the REACH Regulation does not contain the expected limits for PCBs. Neither are PCB limits specified in POPs recast Regulation; but this regulation does contain a more general statement on unintentional trace contaminants, viz Article 4 "Exemption from Control Measures" which states that article 3 shall not apply in the case of a "substance present as an unintentional trace contaminant as specified in the relevant entries of Annex I or II in substances, mixtures or articles." Article 3 lists those substances that shall not be manufactured, placed on the market or used in substances, mixtures, or articles unless there are exemptions. (More details on POPs recast Regulation can be found in Point 1 of Appendix I).

At the workshop organized by German UBA/BMU "Untersuchung von Abfällen auf das Vorkommen nicht-technischer PCB-Kongenere und DecaBDE" on 22 October 2019 in Berlin[12] the presentations emphasised that without a concentration limit given in Annex I, which could be applied to point (b) of Article 4(I) for PCBs present as unintentional trace contaminants, it had to be assumed that this equated to an absolute ban for placing on the market any product containing PCBs ("zero limit"), an argumentation which we find difficult to follow and is complete contradistinction to the 50 ppm limit allowed for recycling (The final report on the studies – including an English Summary is also available.[13])

We find also the definition of Unintentional Trace Contaminant given in POPs recast Regulation very difficult to understand, at a practical level: viz: "unintentional trace contaminant means a level of a substance that is incidentally present in a minimal amount, below which the substance cannot be meaningfully used, and above the detection limit of existing detection methods to enable control and enforcement." The detection limit will be very method dependent, determined not only by the analytical equipment being used but also by the way the sample is treated before the actual analysis; it could range from as little as several ppb to as high as a few ppm. And for the case of PCBs is it the total PCB content or each congener family? A robust detection method, for enforcement, would need to be agreed and specified. See also a Q&A document from the Commission Services regarding a draft commission regulation amending Regulation (EC) No 850/2004[14]

Annex I of POPs recast Regulation contains 26 entries, and for 19 of them, no concentration limits are provided for their presence as unintentional trace contaminants in substances. These 19 substances include all the so-called "Dirty Dozen Chemicals" on the original listing in the Stockholm Convention, which were all included in Regulation (EC) No 850/2004[15]. Those substances where limits are included, with relevance to point (b) of Article 4(1), were essentially all added as amendments to this Regulation following decisions taken under the Stockholm convention resp CLRTAP Protocol; e.g. the limits for PFOS and for PBDEs were included in Regulation (EC) No 850/2004 following decisions taken by COP4 in May 2004. Until further information became available the thresholds specified reflected the values in Annex XVII to REACH Regulation.

About PCB Limit and Reality Check

However, in POPs recast Regulation, there is an additional specification for PCBs which refers to the requirement to remove from use mainly electrical equipment which contain liquid stocks with more than 0.005% PCBs. This 0.005% limit for PCBs is also given in Annex A Part II of the Stockholm Convention, where it asks that every effort should be made to identify other articles (cable-sheaths, cured caulk and painted objects) containing more than 0.005% of PCBs.

In the Regulation (EC) No 1272/2008/EEC[16] (hereafter: CLP Regulation) Annex VI merely requires products contaminated in excess of 50 ppm PCB to be labelled, inter alia using the Signal Word "Warning" (Table 2 below).

At a more recent WebEX Online UBA workshop, Dessau on 23.09.2020[17], "Wie werden wir unserer Verantwortung zu POP Gerecht? – Ein ambitionierter nationaler durchführungsplan 2020 zum Stockholmer übereinkommen" (*"How do we live up to our responsibility to POP? - An ambitious 2020 national implementation plan to the Stockholm Convention"*), inter alia the updating of the NIP (National Implementation Program) was discussed. It was again stated that as no limits were given for PCBs, this meant under current legislation NO PCB must be present in substances, preparations or articles. However, if from the perspective of enforcement it is felt there is a need to set a suitable concentration limit for unintentional trace PCB impurities in Annex I of EU-POP-VO, then an appropriate procedure could be initiated (page 29 of the conference summary by UBA[18]).

Table 2 Citation of updated ECHA 18 Sept., 2018

Index No	International Chemical Identification	EC No	CAS No	Classification		Labelling			Specific Conc. Limits, M-factors	Notes	ATP inserted / ATP Updated
				Hazard Class and Category Code(s)	Hazard Statement Code(s)	Pictogram, Signal Word Code(s)	Hazard statement Code(s)	Suppl. Hazard statement Code(s)			
602-039-00-4	polychlorobiphenyls;PCB	215-648-1	1336-36-3	STOT RE 2* Aquatic Acute 1 Aquatic Chronic 1	H373 ** H400 H410	GHS08 Environmt GHS09 Health Warning	H373 ** H410		STOT RE 2 H373: C ≥ 0,005%	C (= isomer / congener statement required)	CLP00

https://echa.europa.eu/de/information-on-chemicals/cl-inventory-database/-/discli/details/128359

It has to be emphasised that the data shown in Table 1 was contributed by the long-term ETAD members. However, the majority of organic pigments are produced by non-ETAD members, much manufactured in what is often referred to as “low cost manufacturing” countries.

With this in mind, we should probably not just focus on the ETAD generated data; we should pay equal attention to other public data.

Recently Anh, Watanabe; Minh and Takahashi[28] have reviewed the literature spanning the last four decades of pigment derived PCBs. They present results for a wide range of organic pigments as well as *inter alia* discussing possible pathways for the formation of PCBs during pigment manufacture as well as emission routes and fate of the PCBs.

Results are presented for a broad spectrum of organic pigments: mono- and bis-azos, phthalocyanines, quinacridones, DPP, dioxazine, obtained from Asia, Europe and North America and show a wide scatter of results from a few ppb up to several hundred ppm.

In response to a report from the Japan Dyestuff and Industrial Chemicals Association (JDICA) in February 2012 that some organic pigments contained traces amounts of PCBs unintentionally generated as by products, METI, the Ministry of Health, Labour and Welfare (MHLW), and the Ministry of Environment (MOE) collectively requested businesses that manufacture or import pigments that might contain PCBs as by-products to analyse them for the presence of PCBs and to report them to these ministries. The results of which have been published in a number of METI press releases.

This publicly available METI data has already been published in the BAT/EP report[7] and also in slides at the BMU workshop[12] held in October 2019 and is shown in Table 3.

METI has also published compiled results of analyses submitted which includes results of some analyses and reanalyses where it was demonstrated that the analytical method including pretreatment process could influence the determined results (May 10,2013)[20] (Table 4).

The complied METI data shows that some relatively few batches of pigment (approx 3% based on the results data presented) have been placed on the market with PCB values exceeding 50 ppm. It is deeply to be regretted that such material has found its way into commerce and indicated that at a very minimum the final release processes need to be critically looked at. Since December 2012, every Japanese manufacturer/importer have agreed their self-managed upper limit values equal or lower than 50 ppm, and after that time no organic pigments containing more than 50 ppm PCB have been placed on the Japanese market.

The ETAD results (Table 1) show that low PCB content (below 50 ppm) organic pigment can be produced – using the right technology and the right raw materials. The results presented from the METI studies as well as by Anh et al would tend to back this conclusion but they show that it is possible to get it significantly wrong!

A value of less than 50 ppm should be achievable by every manufacturer and we would suggest serve as an initial goal as part of the on-going work to reduce emissions.

But even with good manufacturing technology and good raw materials the results clearly indicate that “zero PCB” is not achievable for organic pigments where chlorine atoms are part of the chromophore or part of a molecule involved in the process e.g. raw material, and/or a solvent.

Table 3. Pigment batches monitored by the Japanese Ministry of Economy and Trade (METI) exceeding 50 ppm limit for import or use in Japan (METI 2013)

Name of Pigment	Name of Product	Amount of PCB (ppm)
Pigment Red 2	ZA-855 Red	37-58
	PERMANENT RED G-87	52
	FAST RED F2R (PR-2) POWDER	61
Pigment Red 112	ZA-862 Red	16 -121 ppm
	Permanent Red GY	
Pigment Yellow 12	Pigment Yellow 1207	1500 ppm
	Disazo Yellow G 178 – 4	110 ppm
Pigment Yellow 13	DISAZO YELLOW 3GR-M	220 ppm
	DISAZO YELLOW 3GR-M-5	
Pigment Yellow 13	Orange BO-01	1000 ppm
Pigment Yellow 14	SUIMEI YELLOW GGNB	810 ppm
Pigment Yellow 17	SUIMEI YELLOW 7G	700 ppm
	SUIMEI YELLOW 7GKT	1000 ppm
Pigment Yellow 55	SUIMEI YELLOW DRO-10	1500 ppm
	SYMULER Fast Yellow 4539	
Pigment Yellow 81	SUIMEI YELLOW F10G	79 ppm
Pigment Yellow 83	SUMIKAPRINT FAST YELLOW HR-M	52 -280 ppm
	SUMITONE FAST YELLOW HR-M-5	
	SUMIKAPRINT FAST YELLOW HR-T-2	
	SUMIKAPRINT FAST YELLOW HR	
	PY-2GN	
	SUIMEI YELLOW ERT	2000 ppm
	SUIMEI YELLOW 5RT	
	Permanent Yellow HR-1183-2	59 ppm
Pigment Yellow 165 ($C_{16}H_{12}Cl_2N_4O$)	FAST YELLOW F5G	208 ppm
Pigment Orange 13	Orange BO-01	1000 ppm
Pigment Orange 34	SUIMEI PYRAZOLONE ORANGE GR-N	190 ppm

Table 4. Results of analyses, published by METI (May 10, 2013)

PCB content in ppm	To 0.5	Over 0.5 to 1	1 – 5	5- 10	10-15	15-20	20-25	25-50	Over 50	Total
Total (including the previous investigations)	359	51	89	29	13	7	10	13	17	588

Potential Consequences of "Zero PCB"

A "zero PCB" in substances would seem to be in distinct contradiction to the information in Annex IV of POPs recast Regulation where articles with a PCB concentration below 50 ppm qualifies waste as recyclable.

- In view of modern sensitive analytical chemistry and its tools, a "zero PCB" requirement would be impossible to meet.
- Besides our grave concerns regarding the analytical aspects of "zero PCB", we envisage further problems regarding the supply of pigments, should the limit be changed "suddenly" or indeed in a "step wise reduction" from 50 ppm to "zero". We doubt if there would be enough suitable such pigment available to fulfil all the needs of our downstream users.

Certainly, there are plenty of e.g. organic Yellow pigments commercially available. In the 4th, completely revised edition of "Industrial Organic Pigments"[21] just over 100 different Yellow organic pigments are listed. (C.I. Generic Names mean different chemical structures). But as pointed out by

CPMA in their presentation at the October 2019 Spokane Conference[22], it is not just the molecular chromophore that is important for pigment users, the product must satisfy many other requirements, many of which are influenced by shape, surface, crystal structure (polymorph), and particle size of the product. Additionally, pigments should be non-toxic to man and the environment.

It is just not possible to change from one pigment chemistry to another overnight – significant resources in time and expertise all along the supply chain are required, ranging from maybe investment in new organic pigment production facilities to reformulating by the downstream users. For automotive paints all the necessary weather fastness data would need to be gathered for all the formulations containing a change in pigment – a process taking several years, while a change in one of the standardised base colours used in four colour printing would not only require reformulation of that ink but would have potentially ramifications additionally for the other three inks.

A “ban” on the large volume and niche specialities would cause severe business disruption and would not stop the import of coloured articles into Germany resp the EU. Controlling with the necessary analyses of this import stream would present significant hurdles.

As mentioned above the concept of “zero PCB” raises severe analytical and conceptual concerns. Each analytical method has a detection limit and a slightly higher quantification limit; these limits are also matrix dependent. And conceptually what does “zero PCB” really mean in this discussion? Not even one molecule of one of the congener families present. Including a limit in a regulation requires both a value as well as a robust analytical procedure.

Additionally, there must be international agreement on the Regulatory definition of PCB, as it is necessary to ensure coherence regarding which congener groups are to be included resp excluded from the limit set. Appendix 1 gives a very brief overview of some representative PCB definitions given in regulations currently in force.

For PCBs, the essential aim of POPs recast Regulation is to minimize with a view to eliminate where feasible as soon as possible releases of this substance.

4. ETADs Proposal

We would suggest that total elimination of unintentional PCBs for organic pigments is not feasible; industry must consequentially minimize their production as an unintentional trace contaminant with all haste. As a first limit 50 ppm, as specified in Council Directive 89/677/EEC, in the CLP Regulation, and referred to in the Stockholm Convention for e.g. painted objects, could be set as a goal with the intention of reducing this to 25 ppm over an agreed time period. The 50 ppm limit is already stricter than the Council Directive 89/677/EEC limit as the mono-chlorinated and di-chlorinated biphenyls are included. In addition, an analytical method should be defined. We recommend ISO 787-28:2019[10]a or DIN EN 787-28:2020-12[10]b, as the both are the only method available which are specifically developed for organic pigments.

The PCB content of organic pigments manufactured by ETAD members has been shown to be less than the 50 ppm so under the POPs recast Regulation waste organic pigment would then be considered as “recyclable”.

In a final coloured article the PCB content would then be considerably lower due to the low dosage level ("pigmentation").

Appendix: Overview of Some Regulations Involving PCBs

1. Regulation (EU) 2019/1021 (POPs recast Regulation)

On a global basis, the risks posed by POPs are addressed by the United Nations; UN Environment sets the global environmental agenda, promotes the coherent implementation of the environmental dimension of sustainable development within the United Nations system and serves as an authoritative advocate for the global environment.

The EU is party to two major international agreements on POPs:

The regional UNECE Convention on Long-Range Transboundary Air Pollution (CLRTAP), which addresses POPs through the Protocol to the 1979 Convention on Long-Range Transboundary Air Pollution on Persistent Organic Pollutants (also known as the 1998 Aarhus POPs Protocol), which entered into force in 2003 and focuses on 16 substances.

The global Stockholm Convention on POPs, which entered into force in 2004. This initially regulated 12 substances, known as the 'dirty dozen'; with a further 16 having been added to the convention since 2009.

Both instruments were implemented in the EU through the Regulation on POPs, Regulation (EC) No (EC) No 850/2004[15]. This regulation has been amended on 12 occasions and the number of POPs under Part A of Annex 1 have evolved to 21 chemicals.

On June 25, 2019, the EU published Regulation (EU) 2019/1021, recasting the POPs Regulation ("POPs recast Regulation"). The POPs recast Regulation repealed the POP Regulations and became effective on July 15, 2019.

The essential aim of the POPs recast Regulation (See **Article 1**) is to protect human health and the environment by:

- Prohibiting, phasing out as soon as possible, or restricting manufacture, placing on the market and use ("trade") of products containing POP substances (see **Article 3** secs. 1 and 2, both subject to article 4)
- Minimising, with a view to eliminate where feasible as soon as possible releases of such substances (**Article 6**)
- Establishing provisions regarding waste consisting of, or contaminated by any of those substances (**Article 7**)
- PCBs are listed in the Regulation in
- Annex I. (List of substances prohibited from manufacturing, placing on the market and use whether on their own, in mixtures or in articles)
- Annex III (List of substances subject to release reduction provisions)
- Annex IV (List of substances subject to waste management provisions, with a PCB concentration below 50 ppm qualifying waste material as "recyclable")

2. Some Representative Regulatory Definitions of PCBs

2.1 Global (UN)

For global implementation of the Stockholm Convention – and also to ensure there are no deviations when implementing POPs recast Regulation into member state specific legislation – an agreed regulatory - rather than just chemical - definition of PCBs needs to be established.

In the Stockholm Convention "Polychlorinated biphenyls" means 209 aromatic compounds formed in such a manner that the hydrogen atoms of the biphenyl molecule (two benzene rings bonded together by a single carbon-carbon bond) may be replaced by up to 10 chlorine atoms. This is the same definition used in REACH and in CLP where CAS # 1336-36-3 is used.

However, PCBs are regulated differently in different regulatory regimes, a few examples of which are shown below:

2.2 European Union

Pre-REACH, the marketing and use of PCBs was regulated by Council Directive 89/677/EEC[4]. The content of PCB/PCT in preparations (including waste oils) was reviewed and the limit of 0.01% set down by Council Directive 85/467/EEC was replaced by 0.005%. According to 76/769/EEC mono- and di-chlorinated biphenyls are exempt[24].

So, with the implementation of POPs recast Regulation there is already a considerable additional restriction for PCBs as there is now no exemption for mono- and dichlorobiphenyls.

2.2.1 Council of Europe (CoE)

CoE, which is a non-EU-entity without legislative powers, adopted resolution "AP (89) 1"[25]. which*, inter alia*, gives a limit for PCBs in colorants for food contact applications as 25 ppm, to be calculated as "Equivalents Decachlorobiphenyl", primarily for historical reasons. A sort of worst-case reporting, re-calculating every homologue group sum into a fictive decachlorobiphenyl by multiplying with the ratio of molecular weights, and summing up. The system is basically a molar quantification of PCBs, multiplied with the molecular weight of decachlorobiphenyl.

2.3 USA

EPA issued regulations under TSCA 40 CFR §761.20[26] to prohibit manufacture, processing, and the commercial distribution of any product containing an annual average of 25 ppm PCB (with a maximum concentration at any time set at 50 ppm). The agency also required manufacturers or importers of products and processes associated with inadvertently produced PCBs to report any individual PCB congener concentrations greater than 2 ppm in such products or processes. In the US the monochlorinated biphenyls (mono-CBs) and dichlorinated biphenyls (di-CBs) are regulated, but there is a discounting factor for reporting purposes (refer to US 40 CFR 761.3): For any purposes under this part, inadvertently generated non-Aroclor PCBs are defined as the total PCBs calculated following division of the quantity of mono-CBs by 50 and di-CBs by 5.

2.4 Canada

According to The PCB Regulations SOR/2008-273[27], a colouring pigment shall contain PCBs produced incidentally less than 50 mg/kg, while an annual average concentration of 25 mg/kg. According to PCB definition laid down in this Regulation, mono- and dichlorinated biphenyls are exempt.

2.5 Japan

According to Japanese Act on the Evaluation of Chemical Substances and Regulation of Their Manufacture[23], PCBs (defined by CAS No 1336-36-3) are categorized as Class I Specified Chemical Substances. The self-managed upper limit value is to set to a level of 50 ppm or less, which is considered to be the concentration at which international distribution is avoided, and within a range that is technically and economically achievable in industry. Every organic pigment manufacturer/importer must submit their own self-mananged upper limit to the competent authorities before marketing and must control them at all times and submit an anual report.

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