

**Inland Empire Paper Company
NPDES Permit No. WA-000082-5
Permit Condition S8**

**Polychlorinated Biphenyls Pollutant
Minimization Plan (PCB PMP)
&
2025 Annual PCB PMP Report**

July 1, 2025

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PCB Pollutant Minimization Plan (PCB PMP) & 2024 Annual PCB PMP Report

1.0 INTRODUCTION

Permit condition S8.A, PCB Pollutant Minimization Plan (PMP), of Inland Empire Paper Company's (IEP) National Pollutant Discharge Elimination System (NPDES) Permit No. WA-000082-5, effective on August 1, 2022, includes a requirement to provide an initial review and update to IEP's existing PCB PMP. Language from the permit includes the following criteria:

The Permittee must review and update its existing PCB PMP and submit it to Ecology for review and approval. The Permittee must also update the PCB PMP as necessary in conjunction with the PCB PMP Annual Report. The updated PMP must include:

- 1. A section that lists members of the cross functional team that developed the initial PCB PMP and those that are responsible for the implementation and on-going revisions to the Plan. The designated team leader for the PCB PMP development, implementation, and on-going revisions must be identified.*
- 2. A section that describes PCB PMP items that have been implemented and an estimate of their effectiveness with respect to either total PCB effluent loading or effluent concentration reductions.*
- 3. A section that identifies any proposed or considered PCB PMP items along with an evaluation of their feasibility, both technical and economic.*
- 4. As appropriate, these PCB PMP items may include substitution of materials, treatment system performance improvement actions, and operational process or procedure revisions or modifications. The PCB PMP shall also include the elements identified in Permit Condition S8.C.*
- 5. A section on site specific BMPs to minimize contributions of PCB to the final discharge during any site disturbance, demolition, and remodeling. Potential contributions may include, but are not limited to, contaminated soil, contaminated sediments, and contaminated stormwater entering the wastewater collection systems during site disturbance, demolition, and remodeling.*
- 6. A section that provides a schedule for the implementation of feasible PCB PMP items that have been identified above.*
- 7. Quality Assurance/Quality Control (QA/QC) Plan for PCB source control and effluent characterization. The QA/QC Plan must include a minimum testing frequency of once per quarter for routine monitoring of PCBs in the final effluent*

(Outfall 001) for effluent characterization using EPA method 1668. Prepare the QA/QC Plan in accordance with the guidelines provided in Guidelines for Preparing Quality Assurance Project Plans for Environmental Studies, Ecology publication 04-03-030.

Permit condition S8.B, PCB PMP Annual Report, requires IEP to provide annual updates on monitoring data, evaluations, and updates to the PCB PMP. Language from the permit includes the following criteria:

The Annual Report must include:

- 1. A section that provides a summary of the previous calendar year's effluent PCB characterization data collection under this section. The data summary shall include PCB effluent loading and concentration data. The data summaries must include congener, homologue, dioxin like congener, and total PCB results. Results shall be presented on an uncensored basis and on a blank censored basis using 5 and 10 times the values detected in the corresponding laboratory blank.*
- 2. A section, as appropriate, that contains any monitoring information relative to the PCB PMP not already provided elsewhere in the Annual Report.*
- 3. A section that evaluates the overall effectiveness of all PCB PMP activities that have been implemented with respect to effluent loadings and concentrations.*
- 4. A section that describes actions and schedules related to PCB source identification and cleanup within the industrial wastewater treatment system.*
- 5. A section that describes any updates made to the PCB PMP.*
- 6. A section that describes the implementation of actions associated with condition S8.C, below.*

IEP has opted to combine these two reporting requirements into a single document in order to more effectively track changes over time.

2.0 CROSS-FUNCTIONAL TEAM FOR PCB PMP DEVELOPMENT

IEP's Engineering, Production and Management staff all play significant roles in the development and implementation of this PMP based on their respective disciplines, responsibilities and departments. Key individuals contributing to this effort include:

Doug Krapas – Environmental Manager and Team Leader
Benjamin Carleton – Technical Superintendent
David Demers – Process Technician
Fletcher Austin – Mill Manager
Kevin Davis – Manager of Strategic Projects
Shawn Arman – Paper Machine Superintendent
Tanner Gerety – Pulp Mill Superintendent
Chris Robinson – President and General Manager

3.0 FOREWORD

3.1 SUMMARY STATEMENT

This report details the results of IEP's investigation into feasible PCB PMP's based on its PCB Source ID Study and the feasibility of PCB reduction opportunities. It should be noted that all PCB containing equipment was removed from IEP several decades ago. The IEP facility was deemed a PCB-free facility through a multi-media inspection performed by the Washington State Department of Ecology (Ecology) and the Environmental Protection Agency (EPA) in the early 1990's.

It is important to note that IEP does not produce or generate PCBs. There is overwhelming evidence that IEP receives PCBs into its facility because of federal regulations that allow for new PCBs to be manufactured and distributed through commerce. The Toxics Substance Control Act (TSCA) allows for the inadvertent generation of PCBs in products up to 50 ppm. IEP receives inadvertently generated PCBs allowable under TSCA in the inks and pigments used in printing on paper that it recycles at its facility. Further discussion of the TSCA concern and actions being taken are discussed in greater detail under Sections 5.0 and 6.0 of this report.

IEP conducted a source identification study in 2015 as a requirement of its NPDES permit. The study confirmed recycled paper as the primary source of PCBs within the facility and wastewater treatment system. A potential mitigation approach is discussed in subsequent sections.

3.2 REPORT OUTLINE

The NPDES permit language for the PCB PMP, reprinted in the Introduction above, supersedes and replaces the prior permit annual reporting of a PCB Best Management Plan (BMP). In order to maintain continuity with the past, IEP has incorporated and reorganized the BMP annual report to meet the updated and more detailed requirements of the new PMP.

IEP has identified five main pathways by which progress on meeting water quality objectives for PCBs might be achieved:

- Advanced treatment technology
- Elimination of paper recycling
- TSCA reform
- Source control
- Regulatory tools

Progression towards effective PCB management is extremely complex and challenging, requiring a holistic approach. The NPDES permit language anticipates a sequential approach, including elements like alternatives considered, economic feasibility, schedule for implementation, and measurable effectiveness. Because of the holistic nature of the pathways, however, many of these elements do not apply at all or may only apply in a limited manner. For the sake of clarity, IEP has opted to present its report in the following order:

- PCB effluent characterization
- Current tasks in progress, including all reporting elements in individual sections as applicable.
- Previous task achievements and implementations, including past versions and status updates of current tasks.

4.0 EFFLUENT PCB CHARACTERIZATION SUMMARY

4.1 QUALITY ASSURANCE PROJECT PLAN

Permit condition S8.A.7 of IEP's NPDES permit WA-000082-5 requires that a Quality Assurance Project Plan (QAPP) be adopted to ensure quality assurance and quality control (QA/QC) for the PCB source control and effluent characterization elements of the PCB PMP.

In December 2024, IEP submitted a revised QAPP to Ecology due to the contract laboratory IEP had been using for many years (SGS AXYS Analytical Services Ltd.) discontinued offering analyses using EPA Method 1668. Section S8.A.7 of IEP's NPDES permit requires testing of PCBs using EPA Method 1668, therefore it was necessary for IEP to find another laboratory that offered this capability:

*...The QA/QC Plan must include a minimum testing frequency of once per quarter for routine monitoring of PCBs in the final effluent (Outfall 001) for effluent characterization using **EPA method 1668** [emphasis added]...*

After researching qualified laboratories and conferring with other Spokane River NPDES permittees, IEP selected Eurofins Sacramento as the replacement contract laboratory. As a necessary part of that change, IEP also clarified the procedures for qualifying data, especially lab-specific elements such as flag qualifiers and limits of detection. The full QAPP is available as Appendix A to the report. Key highlights include the following:

- Purpose statement to reconcile the contradiction between the required use of an unapproved test method (EPA Method 1668) with the scientific rigor of QA/QC.
- List of quality control objectives, including sensitivity, accuracy, precision, representativeness, comparability, and completeness.
- Sampling protocols, including frequency and location (e.g. once per quarter grab samples at IEP's outfall), and sampling method to minimize cross contamination, and frequency and type of QA samples.
- Laboratory protocols for the contract laboratory, including all quality control criteria and corrective actions. Includes definitions and standardization for flag qualifiers and reporting procedures.
- Data interpretation and documentation, with a detailed description of the interpretive method utilized by IEP to account for all quality control data and compile the results. The steps for this process include: flag qualification, blank censoring, precision analysis and handling, accuracy analysis and handling, and summation.

The first sample collected by IEP under the terms of the revised QAPP was fourth quarter (Q4) 2024. The analysis in Results and Discussion accounts for this change in the presentation of the data from Q4 2024 forward.

4.2 RESULTS AND DISCUSSION

Total PCBs

This section summarizes IEP's outfall PCB data. The complete set of historical data, including individual congeners and laboratory blanks, is available as Appendix B to this report.

Beginning in Q4 2024, in conjunction with the switch in contract laboratory and the revision to IEP's QAPP, additional information is available to evaluate the reliability of using the data collected under EPA Method 1668. At the time of this annual 2024 report, only two samples have been evaluated under the revision, but some data patterns from Table 1, presented below, have already emerged that are notable and worth emphasis:

- Between 99-100% of all congeners (at 10x blank censor level) are flagged with a qualifier and decreases the reliability of quantification.
- Between 96-99% of all congeners (at 10x blank censor level) failed to meet quality control criteria.
- The sample range (min-max) is broad, in one case (12/13/2024) straddling the existing permit limit of 170 pg/L. The broadness is due to the fact that nearly all congeners are flagged with a quantification qualifier.
- The relative standard deviation (RSD), a measure of sample variance and an indicator of where the true population value lies, increases with higher blank censor levels as the effects of blank contamination are corrected.
- The RSD exceeds 100% in one sample (12/13/2024), indicating that the presence of PCBs is not certain; even if the presence of PCBs can be proven, the true quantification level is seriously threatened and difficult to defend against the water quality standard.

With IEP's more scientifically rigorous analysis of data beginning with Q4 2024, there is no quantifiable way to reduce a sample concentration to a single value. The best that can be determined, in most cases, is a concentration range. But even that range is subject to serious doubt, because nearly all individual congeners are flagged as below the reporting limit (or some other flag that disqualifies or casts doubt on its validity), and very few, less than 4%, of the congeners pass quality control criteria. While IEP has not conducted a formal statistical analysis, it is nevertheless noted that relative standard deviations greater than 40% (or, in one case, over 100%), is so broad as to render the quantification data practically meaningless. Even if it is stipulated that PCBs have been detected in some amount in the outfall, it does not follow that it can be compared to a numeric limit. It remains IEP's position that the use of EPA Method 1668, a method that has not been promulgated under 40 CFR 136, should not be used for reasonable potential analysis because of its long-standing and well-documented issues with quality assurance. The data IEP has collected since 2015 has always supported that position, and, with the switch in contract laboratories, the body of evidence continues to grow.

Table 1: Summary of Total PCB Concentration Data

	Total PCBs Concentration (pg/L)					
	Censor 0x	Censor 5x	Censor 10x			
	Mean (±RSD)	Mean (±RSD)	Mean (±RSD) ⁽¹⁾	Min-Max Rng. ⁽²⁾	% Flagged ⁽³⁾	% Failed QC ⁽⁴⁾
3/25/2025	797 (±33%)	636 (±38%)	542 (±42%)	380-704	99.0%	96.7%
12/13/2024 ⁽⁵⁾	488 (±52%)	335 (±78%)	169 (±104%)	65-313	100%	98.6%
8/13/2024	859	630	546			
6/21/2024	650	346	120			
1/29/2024	404	288	191			
11/30/2023	2,232	1,799	1,457			
9/12/2023	660	22	10			
5/19/2023	606	479	138			
3/8/2023	900	70	8			
10/28/2022	1,949	882	432			
9/27/2022	634	156	72			
5/20/2022	1,101	1,010	631			
3/22/2022	669	546	390			
10/14/2021	2,987	2,802	2,230			
9/20/2021	2,000	1,731	1,095			
4/19/2021	737	641	362			
1/22/2021	3,269	3,269	3,181			
12/18/2020	2,784	2,714	2,643			
9/24/2020 ⁽⁶⁾	18,000	17,926	17,815			
4/3/2020	780	664	501			
1/16/2020	1,975	1,764	1,601			
12/3/2019	5,359	5,250	4,804			
9/9/2019	749	672	550			
6/19/2019	985	901	852			
2/27/2019	10,190	10,124	10,066			
10/5/2018	8,538	8,530	8,462			
7/26/2018	2,020	1,999	1,883			
5/9/2018	708	618	499			
3/9/2018	2,171	2,171	1,855			
12/5/2017	2,745	2,671	2,001			
7/18/2017	1,173	1,091	526			
6/15/2017	1,372	1,250	608			
3/14/2017	2,573	2,418	1,977			
12/2/2016	2,331	1,934	1,133			
8/29/2016	6,589	6,556	6,556			
6/6/2016	4,691	4,619	4,330			
1/11/2016	3,174	3,095	3,065			

12/28/2015	2,996	2,930	2,388	
8/28/2015	3,209	2,903	1,956	
4/24/2015	2,453	2,283	2,024	
2/17/2015	1,760	967	610	
<p><i>Footnotes:</i></p> <p>⁽¹⁾Mean = the sum of individual congener means; for sample dates without duplicate, the mean for an individual congener is equal to the analytical value. RSD = Relative Standard Deviation; standard deviation of each congener is evaluated separately, then summed and divided by the sum of the means</p> <p>⁽²⁾Min-Max range; expressed as the lowest and highest value in the data set, e.g., not expressed as the difference of two values</p> <p>⁽³⁾% Flagged is the total number of congeners that have a qualified value, including non-detects and blank-censored values</p> <p>⁽⁴⁾% Failed QC is the total number of congeners that did not meet QC criteria for numeric quantification, including non-detects and blank-censored values</p> <p>⁽⁵⁾QAPP revision in December 2024 modified reporting criteria for samples after the revision was adopted</p> <p>⁽⁶⁾Likely outlier in Q3 2020</p>				

While the quantification values in Table 1 cannot be taken at face value for all the aforementioned reasons, the results nevertheless demonstrate that IEP's state-of-the-art treatment system is exceptionally effective in removing PCBs.

The four lowest Total PCB sample concentrations (at 10X censor) have all been collected since 2022, with one occurring last year:

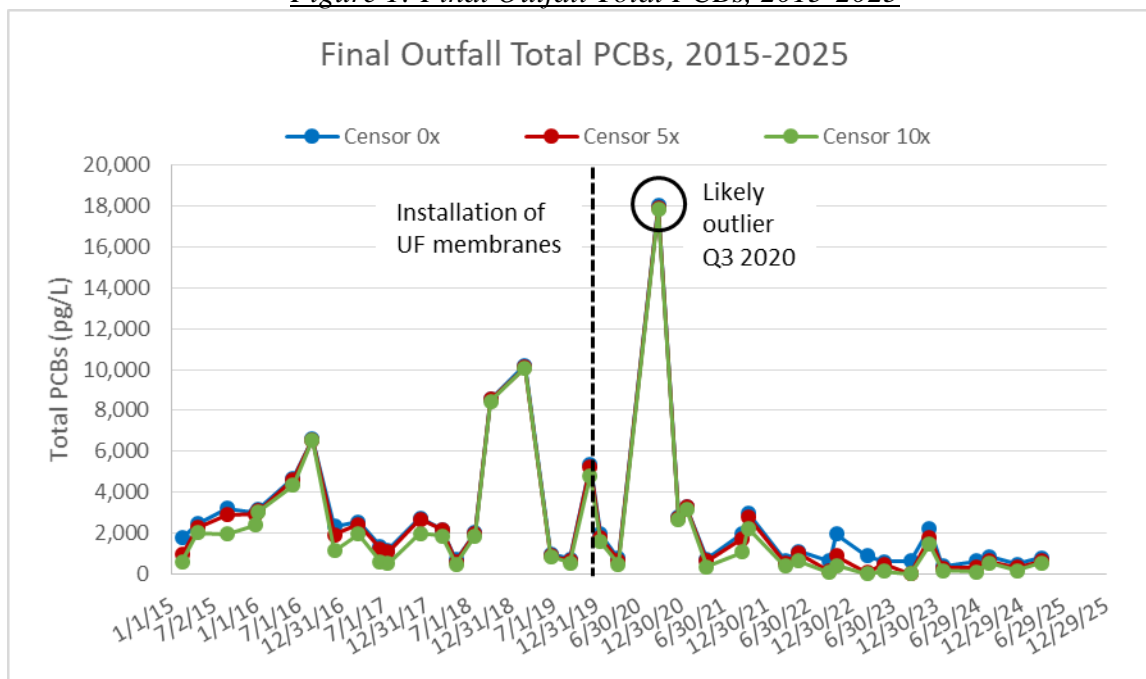
- 9/27/2022
- 3/8/2023
- 9/12/2023
- 6/21/2024

In contrast, the four highest Total PCB concentrations (at 10X censor, excluding Q3 2020 due to likely outlier status) occurred before 2020, which was the year IEP installed and commissioned the ultrafiltration membrane tertiary treatment system (see Section 5.1).:

- 8/29/2016
- 10/5/2018
- 2/27/2019
- 12/3/2019

The long term trend dating back to 2015, in the graph below, shows an obvious downward slope, with credit going toward the cumulative efforts of IEP's best management practices.

Figure 1: Final Outfall Total PCBs, 2015-2025



Startup and commissioning of the ultrafiltration tertiary system began in 2020 with steadily optimized treatment in the years since, bringing IEP to the fore of the best available, known, and reasonable technology (AKART) for PCB removal.¹ For a larger discussion of the background and rationale for the selection of this technology, see Sections 5.1 and 6.1. In addition, the reduction and possible elimination of recycled paper as a feed furnish reached its lowest points in calendar years 2022-2023, with the year-to-date 2024 furnish and projection for the remainder of the year on track to be even lower. As discussed in greater detail in Sections 5.2 and 6.2, the reduction of recycling comes with an unfortunate tradeoff, because any paper not recycled by IEP is likely destined for landfills, including the PCBs that would otherwise have been destroyed by IEP. Maximizing paper recycling is a net benefit to society, especially considering IEP's advanced treatment processes remove and permanently destroy 99.9% of PCBs, thus removing them permanently from the ecosystem. The elimination of paper recycling is driven by regulatory priorities, not by IEP's own choice, and while it may produce some nominal improvement in effluent PCB concentrations at IEP, it pales in comparison to the massive environmental cost that allows untreated PCBs to continue to circulate through the ecosystem unabated.

Homolog Distribution

Homolog distribution is shown in the tables and graphs below. All values are summarized at a 10x blank censoring level. Beginning in Q4 2024, the mean concentration is used in place of the more representative concentration range in order to calculate simple summary

¹ Fact Sheet for NPDES Permit WA0000825 Inland Empire Paper Company. Effective 08/01/2022. Section III.B. Surface Water Quality-Based Effluent Limits, Mixing Zones, page 22: "Ecology has determined that the treatment provided at IEP meets the requirements of AKART (see "Technology-based Limits")."

statistics. However, as discussed above regarding the unreliability of the Method 1668 results, IEP objects to the use and reliability of this data to arrive at any valid conclusions.

Table 2: 2023 Homolog Summary

CY2023 Homolog Summary (10x Censor)				
	Concentration (pg/L)			
	3/8/2023	5/19/2023	9/12/2023	11/30/2023
(H1) Mono-CB	0	0	0	0
(H2) Di-CB	3	0	6	195
(H3) Tri-CB	2	102	0	639
(H4) Tetra-CB	2	12	0	612
(H5) Penta-CB	0	13	3	7
(H6) Hexa-CB	0	4	0	0
(H7) Hepta-CB	0	4	1	2
(H8) Octa-CB	0	4	0	2
(H9) Nona-CB	1	0	0	0
(H10) Deca-CB	0	0	0	0
(D) Dioxin-like	1	0	0	8
Total PCBs	8	138	10	1,457
	Relative Abundance (%)			
	3/8/2023	5/19/2023	9/12/2023	11/30/2023
(H1) Mono-CB	0%	0%	0%	0%
(H2) Di-CB	43%	0%	56%	13%
(H3) Tri-CB	20%	74%	0%	44%
(H4) Tetra-CB	25%	8%	0%	42%
(H5) Penta-CB	0%	9%	33%	0%
(H6) Hexa-CB	0%	3%	0%	0%
(H7) Hepta-CB	0%	3%	11%	0%
(H8) Octa-CB	0%	3%	0%	0%
(H9) Nona-CB	12%	0%	0%	0%
(H10) Deca-CB	0%	0%	0%	0%

Table 3: 2024 Homolog Summary

CY2024 Homolog Summary (10x Censor)				
	Concentration (pg/L)			
	1/29/2024	6/21/2024	8/13/2024	12/13/2024
(H1) Mono-CB	0	0	45	17
(H2) Di-CB	19	3	126	14
(H3) Tri-CB	155	95	323	101
(H4) Tetra-CB	14	16	33	37
(H5) Penta-CB	0	4	17	0
(H6) Hexa-CB	2	2	0	0
(H7) Hepta-CB	0	0	1	0
(H8) Octa-CB	0	1	1	0
(H9) Nona-CB	0	0	0	0

(H10) Deca-CB	0	0	0	0
(D) Dioxin-like	0	5	1	0
Total PCBs	191	120	546	169
	Relative Abundance (%)			
	1/29/2024	6/21/2024	8/13/2024	12/13/2024*
(H1) Mono-CB	0%	0%	8%	10%
(H2) Di-CB	10%	2%	23%	8%
(H3) Tri-CB	82%	79%	59%	60%
(H4) Tetra-CB	7%	13%	6%	22%
(H5) Penta-CB	0%	4%	3%	0%
(H6) Hexa-CB	1%	1%	0%	0%
(H7) Hepta-CB	0%	0%	0%	0%
(H8) Octa-CB	0%	0%	0%	0%
(H9) Nona-CB	0%	0%	0%	0%
(H10) Deca-CB	0%	0%	0%	0%

*Values shown are mean concentration

Table 4: 2025 Homolog Summary (Year-to-Date)

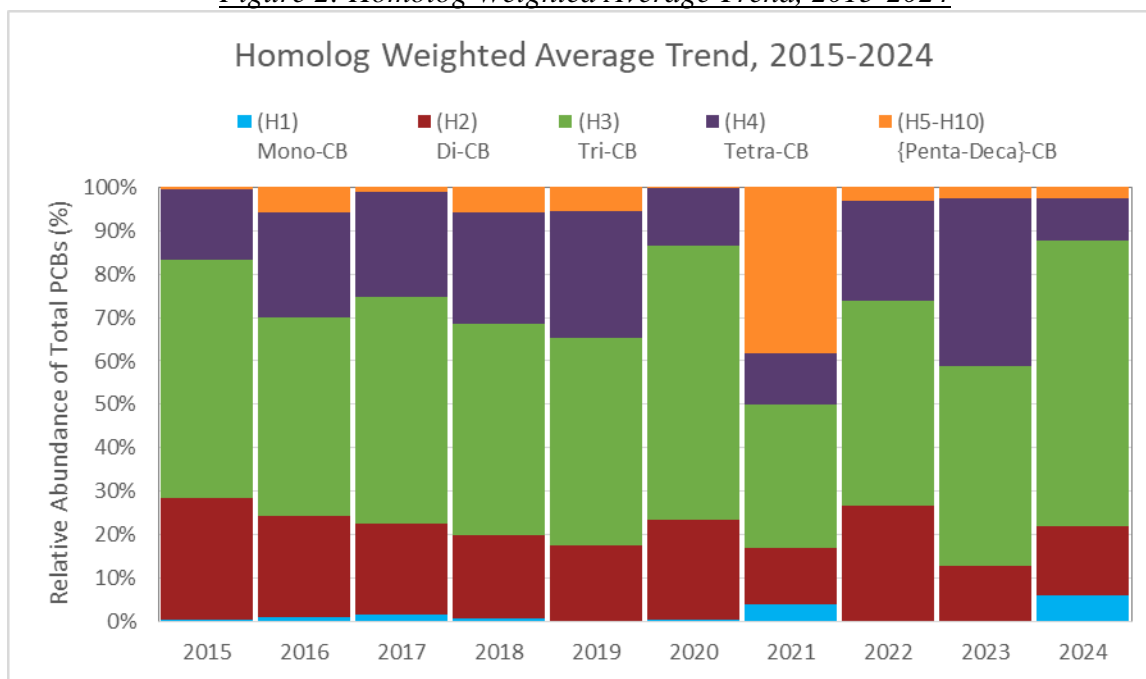
CY2025 Homolog Summary (10x Censor)				
	Concentration (pg/L)*			
	3/25/2025			
(H1) Mono-CB	120			
(H2) Di-CB	178			
(H3) Tri-CB	198			
(H4) Tetra-CB	45			
(H5) Penta-CB	0			
(H6) Hexa-CB	0			
(H7) Hepta-CB	0			
(H8) Octa-CB	0			
(H9) Nona-CB	0			
(H10) Deca-CB	0			
(D) Dioxin-like	0			
Total PCBs	542			
	Relative Abundance (%)			
	3/25/2025			
(H1) Mono-CB	22%			
(H2) Di-CB	33%			
(H3) Tri-CB	37%			
(H4) Tetra-CB	8%			
(H5) Penta-CB	0%			
(H6) Hexa-CB	0%			
(H7) Hepta-CB	0%			
(H8) Octa-CB	0%			
(H9) Nona-CB	0%			
(H10) Deca-CB	0%			

*Values shown are mean concentration

Table 5: 2015-2024 Compiled Homolog Summary

	Relative Abundance, Weighted Yearly Average (%)									
	H1	H2	H3	H4	H5	H6	H7	H8	H9	H10
2015	0%	28%	55%	16%	0%	0%	0%	0%	0%	0%
2016	1%	23%	46%	24%	5%	1%	0%	0%	0%	0%
2017	2%	21%	52%	24%	1%	0%	0%	0%	0%	0%
2018	1%	19%	49%	26%	5%	0%	0%	0%	0%	0%
2019	0%	18%	48%	29%	5%	1%	0%	0%	0%	0%
2020	0%	23%	63%	13%	0%	0%	0%	0%	0%	0%
2021	4%	13%	33%	12%	6%	14%	13%	4%	0%	1%
2022	0%	27%	47%	23%	1%	1%	0%	0%	0%	0%
2023	0%	13%	46%	39%	1%	0%	0%	0%	0%	0%
2024	6%	16%	66%	10%	2%	0%	0%	0%	0%	0%

Figure 2: Homolog Weighted Average Trend, 2015-2024



Consistent with all previous years (except 2021), the presence of congeners with five or more chlorinated functional groups is small or non-existent. Calculating the yearly weighted average, taking into account the magnitude of each sample, the high molecular weight biphenyls (five or more) only accounted for 1% of the overall distribution. It can be concluded from this consistent performance that IEP's wastewater treatment system is highly selective and exceedingly effective at removing high molecular weight PCB congeners. This is a relevant point because, as documented in greater detail in Section 6.3,

the bioaccumulation of PCBs in fish tissue occur almost exclusively in the higher molecular weight range. Consequently, because IEP's discharge contains almost exclusively lower molecular weight PCBs, it is unlikely to be causing or contributing to bioaccumulation in fish tissue, which is the sole basis for the human health and water quality criteria limit of 1.37 pg/L. Additionally, the lower level congeners which are known to be soluble, likely pass through IEP's ultrafiltration system mostly unabated. Lower level congeners are associated with the TSCA allowable inks and pigments, and could be mitigated with a reduction and/or elimination of the TSCA allowance.

5.0 CURRENT PMP TASKS IN PROGRESS OR CONSIDERED

5.1 ADVANCED TREATMENT TECHNOLOGY

IEP currently has the most sophisticated and advanced process water treatment system in the pulp and paper industry. This includes a first in the industry tertiary membrane filtration system for enhanced treatment of its final effluent. The ultrafiltration (UF) membranes remove 100% of total suspended solids (TSS) and subsequently any PCBs in solid form or adsorbed to solids. In conjunction with tertiary treatment, IEP has taken significant action to optimize the existing secondary biological treatment with the intent to remove biodegradable material (measured as biochemical oxygen demand, or BOD) to non-detectable levels. It is believed that the combination of these two components will result in optimal reduction of PCBs due to maximum biological absorption and complete suspended solids removal by the membrane system.

Tertiary Treatment

The selection of UF membranes was the culmination of a decades-long process to comply with the requirements of the Dissolved Oxygen Total Maximum Daily Load (DO TMDL). IEP submits a detailed, publicly accessible annual report about technological updates and progress under Section S4 of the NPDES permit outlining in detail the actions undertaken, a large portion of which was finding a tertiary treatment technology that would be practical, economical, and effective for IEP. See also Section 6.1 of this report, underscoring how the twin goals of nutrient reduction and PCB reduction have proceeded simultaneously and largely have the same technological approach.

With installation complete in 2020, all that remains is ongoing optimization and routine operation. In recent years, IEP has shifted the focus back towards secondary treatment to enhance both nutrient and PCB reduction upstream of the tertiary membrane system.

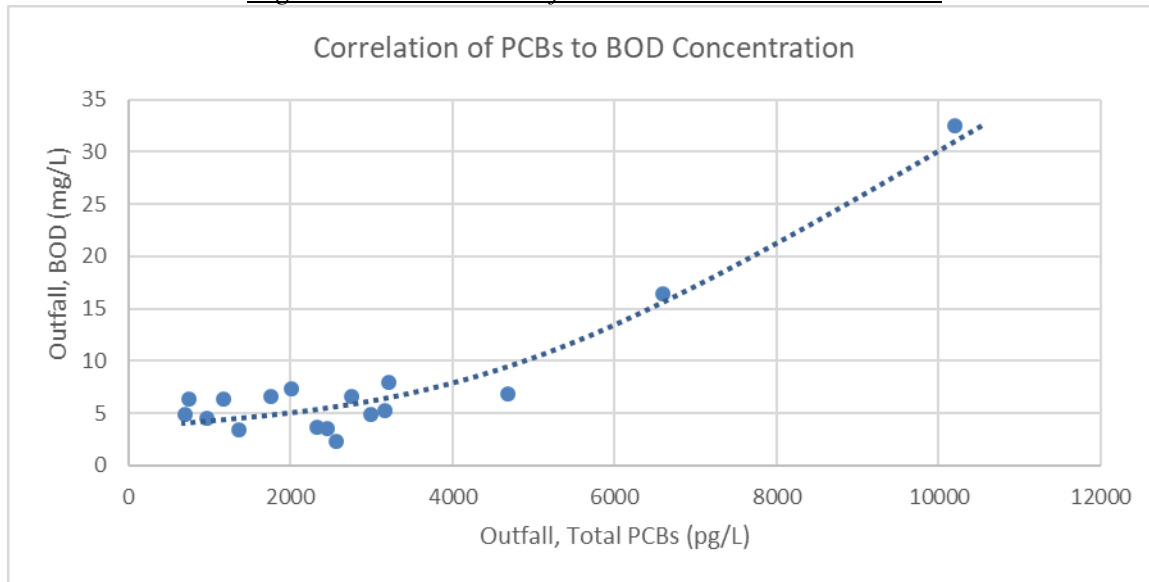
2025 Status Update:

Using ultrafiltration technology for pulp and paper water treatment is unprecedented and, even after multiple years of operation, occasionally presents challenges not applicable elsewhere. IEP continues to resolve issues related to pre-filtration plugging, biofouling, enhanced membrane cleans, and optimization of upstream processes. Further optimization of the tertiary treatment system will subsequently lead to enhanced removal of PCBs.

Secondary Treatment

The graph below shows a clear correlation that effluent PCB concentration is minimized when BOD is minimized.

Figure 3: Correlation of PCBs to BOD Concentration



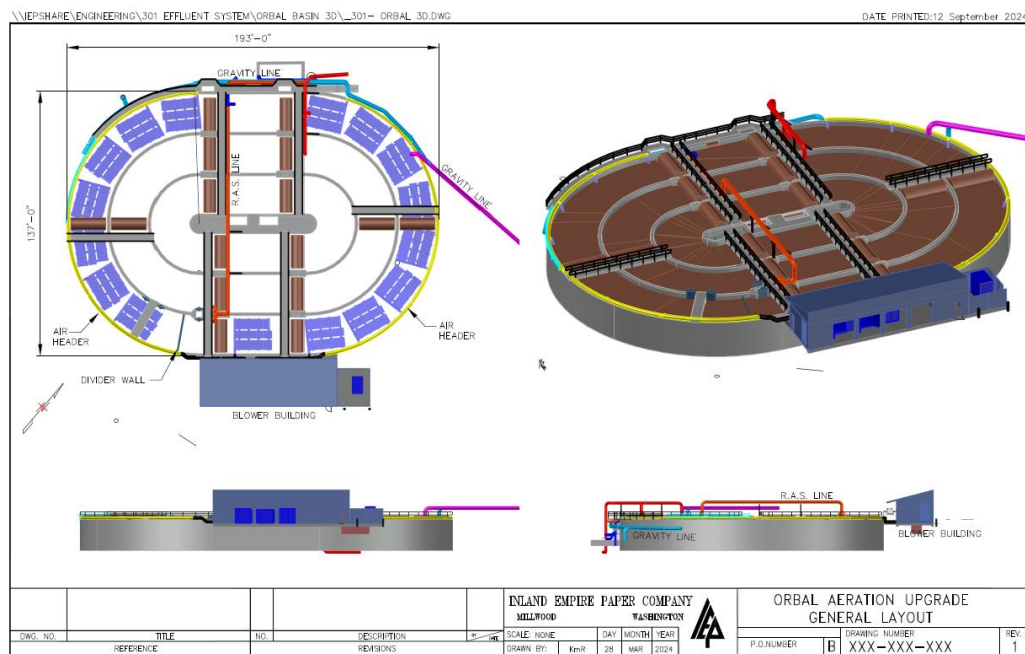
IEP's annual report under S4 of the NPDES permit describes in detail the past and current actions to enhance secondary treatment to the greatest extent possible.

2025 Status Update:

IEP completed installation of a capital project to maximize BOD removal in the secondary treatment system in the first quarter of 2025. Aeration technology was upgraded from mechanical surface aeration in the first oxidation channel, and the bioreactor was converted from well-mixed to partial plug-flow. These enhancements are expected to significantly reduce or eliminate bottlenecks for biological treatment. As evidence of this success, preliminary microbiological assessments have validated that microorganisms that thrive in low dissolved oxygen and low BOD concentration environments have been essentially eliminated from the population, leaving in place a healthier and more robust biomass.

With this significant change in bioreactor environment, IEP is undergoing an extensive reassessment of operational criteria and optimization for minimizing effluent BOD.

Figure 4: Aeration Upgrade Engineering Drawing (Example)



PCB Destruction

PCBs are notorious for being difficult to destroy and persist in the environment as they cycle through the ecosystem, leading to bio-accumulation and toxicity. It is worth noting that the PCBs removed by IEP's WWTs are completely destroyed through thermal destruction in a fluidized bed combustion system, therefore preventing any future opportunities for environmental contamination. After completion of the tertiary UF membrane system in 2020, Ecology has determined that IEP's collection of technologies represents the most advanced treatment system for the removal and destruction of PCBs.²

Advanced Water Conservation

Apart from new technology, from 2004 to 2015, IEP implemented a series of water conservation projects (see Section 6.8) that maximized the amount of reuse that was then available. With the installation of tertiary ultrafiltration membranes, IEP now has access to another source of ultra-clean water and potential avenues of water reclamation that were not previously available. IEP may have the potential to supplant a portion of existing aquifer well water consumption, thereby reducing the flow and loading of PCBs to the Spokane River. Some potential areas of application include:

- Replace fresh water makeup to Filtered Shower Water chest
- Replace fresh water makeup to Conustrenner Reclaim chest

² Fact Sheet for NPDES Permit WA0000825 Inland Empire Paper Company. Effective 08/01/2022. Section III.B. Surface Water Quality-Based Effluent Limits, Mixing Zones, page 22: "Ecology has determined that the treatment provided at IEP meets the requirements of AKART (see "Technology-based Limits")."

- Replace fresh water makeup to Refiner Whitewater chest
- Replace fresh water makeup during paper wet end break

The main disadvantage to these reuse concepts is similar to the problems experienced with the previous conservation and reuse projects in that they cause internal water recycle that cross-contaminates all processing elements in the mill and increase concentration of PCBs because of lower flows. IEP is also exploring other avenues to beneficially and consumptively reuse treated wastewater in order to reduce total flow to the Spokane River.

Other Considerations

IEP is obligated under WAC 173-201A-400, as a condition of receiving a mixing zone authorization under a NPDES permit, to apply “all known, available and reasonable technology” (AKART) to water treatment. At this point in time, IEP currently meets the requirement of AKART with the recent installation of tertiary ultrafiltration membranes.³

No other “known” or “reasonable” technology is commercially available that could further reduce PCB loading with technology alone. Nevertheless, technologies develop over time and IEP is considering ways to contribute to applied research and development that could eventually be considered AKART.

5.2 REDUCTION OR ELIMINATION OF PAPER RECYCLING

IEP installed an integrated paper recycling system in 1991, making it the 6th largest recycler of paper in the United States. The recycling facility was installed in response to California State environmental policies requiring a minimum recycle content to paper consumed within the State.⁴ Since that time, many other states have adopted similar environmental policies requiring recycled paper content. IEP has the capability of producing a finished paper with up to 100% recycle content, and subsequently IEP’s raw material supply averaged approximately 60% from 1991 until 2010 prior to when the PCB concern was identified.

It is well documented that IEP receives PCBs as a consequence of its paper recycling efforts, where the recycled paper includes inks and pigments that contain inadvertently generated PCBs (see Section 5.3 above). These PCB containing pigments and inks are used in printing of newspapers, magazines, and numerous other printed materials. IEP receives trace quantities of these PCBs from the recycling of old newsprint, magazines and other waste paper products that ultimately end up in IEP’s wastewater discharge.

³ Fact Sheet for NPDES Permit WA0000825 Inland Empire Paper Company. Effective 08/01/2022. Section III.B. Surface Water Quality-Based Effluent Limits, Mixing Zones, page 22: “Ecology has determined that the treatment provided at IEP meets the requirements of AKART (see “Technology-based Limits”).”

⁴ CA Public Resources Code, Chapter 15, Article. Recycled-Content Newsprint Program, https://leginfo.ca.gov/faces/codes_displayText.xhtml?lawCode=PRC&division=30.&title=&part=3.&chapter=15.&article=2

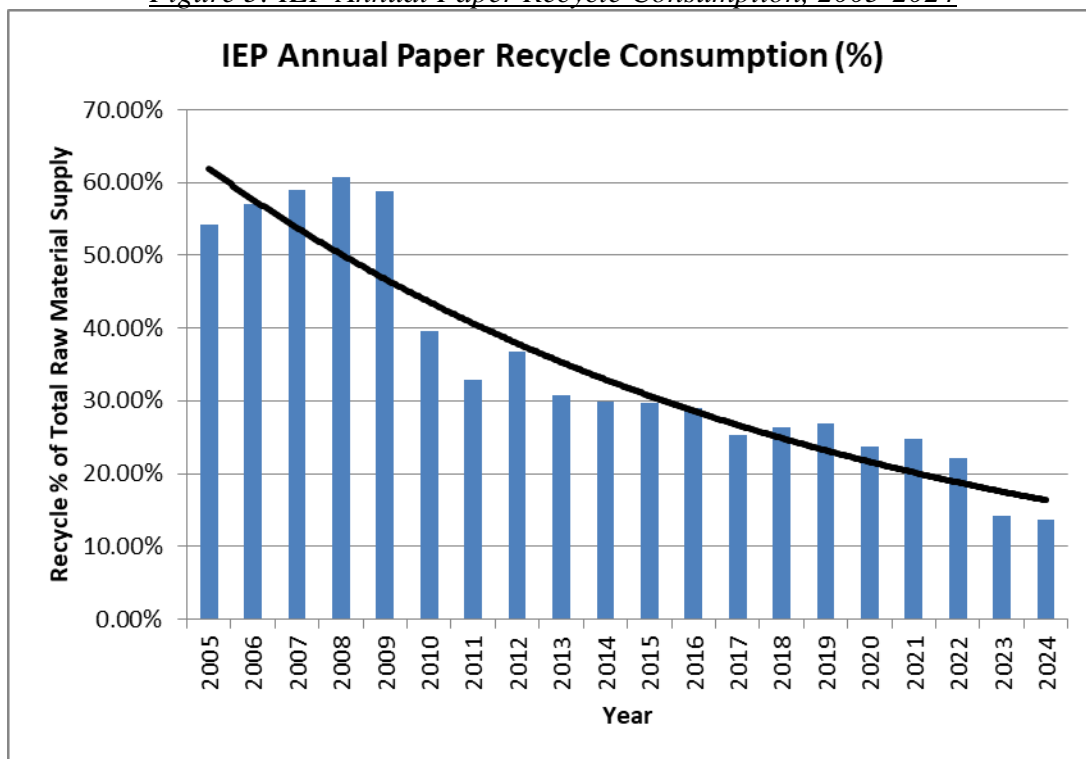
IEP has the most advanced treatment processes that are extremely effective in removing and destroying the majority of PCBs coming into its facility (see Section 5.1 Advanced Treatment Technology). There are no known commercially available technologies for the removal of PCBs to the levels necessary to meet the above water quality criteria, so the only alternative for ultimate compliance may be the elimination of paper recycling at IEP. It is important to note that this will not resolve the PCBs in inks and pigments concern and will likely further exacerbate their environmental impact by creating additional unabated pathways into the environment. Changing the federal regulations to eliminate the continued manufacture of inadvertent PCBs is a more obvious common-sense solution as opposed to the elimination of paper recycling or the closure of mills unable to comply with new water quality standards that will have obvious environmental and economic consequences.

IEP believes that the preservation of recycling provides significant environmental benefits that include conservation of natural resources, energy savings, reductions in greenhouse gas emissions and reductions in landfill space. IEP's processes are also very effective in removing and destroying more than 99.9% of the PCBs coming into its facilities, thus preventing further contamination of the environment.

The overall effect of eliminating recycling would likely have significant consequences for IEP. This action may result in a net negative environmental impact due to the elimination of all the beneficial aspects of recycling. Also, IEP would cease to have the capability of providing a finished paper product with recycled content and would lose this market share. IEP installed its integrated recycling facility in 1991 due to environmental directives and paradoxically it is now environmental regulations that now threaten the future of recycling at IEP.

Since the PCB concern was identified, IEP began reducing its dependency on recycled paper from its historical high of 61% in 2008 to below 14% so far in 2024:

Figure 5: IEP Annual Paper Recycle Consumption, 2005-2024



It is difficult to ascertain the overall implications of this reduction of recycled paper consumption on PCBs due to limited analyses, evolution of improvements to the wastewater treatment system and the many variables associated with IEP's operations, such as the variation of recycled paper consumption from 0 to 100% and the over 60 grades of paper being produced. However, the Variance/HAC study that IEP performed to support the variance application confirmed lower PCB levels in IEP's effluent with reduced amounts of recycled paper consumption. Additionally, the lowest PCB levels historically observed by IEP of 8 pg/L in February, 2023 and 10pg/L in August, 2023 (reference Chart in Section 4.2 at 10X blank censoring) are consistent with the reduced consumption of recycled paper content at IEP. It is intuitively obvious that reducing or eliminating the identified primary source of PCBs into IEP's facility will have a corresponding benefit to the reduction of PCBs in IEP's final effluent, therefore the reduction or elimination of recycled papers will remain as a primary PMP, regardless of the recognized environmental benefits of paper recycling

5.3 TSCA REFORM

The PCB problem for water quality compliance derives from the federal allowance for PCB concentrations up to 50 parts per million (ppm) in manufactured products.⁵ This allowance

⁵40 CFR 761.3. Title 40 Code of Federal Regulations, Part 761: Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions. Available at: <https://www.ecfr.gov/current/title-40/chapter-I/subchapter-R/part-761>

under EPA's Toxic Substance Control Act (TSCA) results in the presence of PCBs in a wide range of commercial and consumer products, including caulking, soaps, pigments, inks, dyes, and paints. PCBs present in commercial and consumer products enter the environment through many pathways, including ambient deposition, stormwater, pulp and paper mills that process recycled paper products, and municipal wastewater treatment plants.

In the Pacific Northwest, EPA is requiring public and private facilities to meet very stringent PCB water quality criteria placing dischargers in the impossible position of trying to treat the presence of PCBs that result from EPA's TSCA regulations that are billions of times apart:

Figure 6: TSCA Federal Allowance Compared to Water Quality Limits

Reference	PCB Concentration (ppm)	PCB Concentration (ppg)	Magnitude Difference
Federal TSCA Allowance	50	50 000 000 000	----
EPA Standard Imposed on WA	0.000000007	7.0	7,142,857,143
*Spokane Tribe WQS	0.0000000013	1.3	38,461,538,462

The stringent water quality standards being imposed across the U.S. for PCBs is a threat to the future of paper recycling as mills would need to eliminate the source of PCBs coming into their facilities via recycled paper products that are printed with inks allowable under TSCA (see Section 5.2 of this report on the Reduction or Elimination of Paper Recycling). It is important to note that paper mills such as IEP have the capability to remove and destroy over 99.9% of the PCBs coming into its facilities, but unfortunately that is not sufficient to meet the imposed water quality standards. Regulating agencies acknowledge that there is currently no way for dischargers to technically or economically achieve this burden, and have recommended variances to NPDES permits faced with PCB water quality compliance.

IEP in conjunction with many different industrial, municipal, environmental, tribal, and legislative entities are pursuing TSCA reform. Mitigating the PCB issue at the source in pigments, paints, inks, and other products will relieve the significant technological, environmental, and economic burdens on water treatment facilities throughout the country. In order to provide the most environmental benefit it is necessary to hold the producers of PCB containing products to the same level of standards as the treatment facilities that are saddled with the challenge of removing PCBs. To address this issue IEP has taken a leadership role over the past 20 years and has most recently been pursuing the following efforts to address the TSCA/CWA regulatory paradox:

- *Senate Bill 5369, Reassessing standards for polychlorinated biphenyls in consumer products*
- *Strengthening Inadvertent PCB Regulation through Citizen Petition under Section 21 of the Toxic Substances Control Act*

Both of the above efforts culminated in Washington State filing a formal TSCA petition on January 4, 2024 to initiate rulemaking to protect public health against PCBs by asking EPA to tighten limits on inadvertent PCBs in consumer products and eventually ban them altogether.⁶ Unfortunately, on April 4, 2024, EPA denied the State of WA’s petition, stating that “the petition failed to point with any specificity to deficiencies in the agency’s promulgation of the 1984 final rule and determination of no unreasonable risk under TSCA section 6(e).”⁷ It is apparent from this decision, that EPA has no intention of addressing this regulatory paradox and intends to simply place the burden of compliance with unattainable water quality standards on the backs of businesses and ratepayers. After all the exhaustive efforts by IEP and others to address the TSCA exclusion as summarized herein, IEP sees no other pathways for TSCA reform and will no longer pursue this as a viable Pollutant Minimization Plan alternative.

2025 Status Update:

In November 2024, the Washington State Department of Ecology (Ecology) published a report to the Legislature entitled *WA Draft Identification of Priority Products* under the Safer Products for Washington program.⁸ The report identified printing inks as a significant source of PCBs and as a result is researching whether chlorine-free pigments, which don’t contain inadvertently generated PCBs, are feasible and available. During this process, they intend to determine whether to propose a prohibition on the use of processes known to generate PCBs. IEP will continue to monitor this process and assist Ecology with evidence from its study to develop low or zero iPCB inks for printing project being conducted through the Spokane River Regional Toxics Advisory Committee (SRTAC), as discussed in greater detail in Section 5.4 Source Control below. IEP is confident that non-chlorinated pigment and ink formulations exist and are practical that could lead to significant reductions of PCBs in commerce and to the ecosystem. Washington State could take a leadership role in the implementation of such efforts by imposing “prohibitions on the use of processes known to generate PCBs” that could ultimately encourage the pigment and ink industry and subsequent downstream users to utilize these more environmentally friendly alternatives.

5.4 SOURCE CONTROL

Due to EPA’s reluctance to resolve the discrepancies between the Clean Water Act and the TSCA allowance for PCBs (see Sections 5.3 and 5.2 above regarding *TSCA Reform & Reduction or Elimination of Recycling*), IEP and other stakeholders have been forced to find workarounds to this regulatory paradox. Many of these efforts and successes are summarized in the historical BMP’s Section 6.0 of this report. In 2022, the iPCB/TSCA Workgroup completed development of a Pigment Resource for inks and pigments using non-chlorinated processes.

⁶ <https://ecology.wa.gov/getattachment/6f61bfb0-b8b1-41ca-8baa-ea7ae01a2cf4/PCB-Petition-to-EPA.pdf>

⁷ https://www.epa.gov/system/files/documents/2024-04/11666-01_letter_petition_response_aa_esignature_2024-04-04.pdf

⁸ <https://apps.ecology.wa.gov/publications/documents/2404049.pdf>

After completion of the Pigment Resource, the iPCB/TSCA workgroup then developed a project to put this tool into practice by assembling a team of publishers, and pigment and ink manufacturers to develop alternative non-chlorinated pigments and inks as replacements for current pigments and inks being used by publishers. Unfortunately, as of June 30, 2023, the Spokane River Regional Toxics Task Force (SRRTTF) which had been funding this project, has been suspended due to EPA's pursuit of a PCB TMDL. This project is on hold indefinitely pending reorganization of future PCB mitigation efforts and funding.

2025 Status Update:

The Spokane River Regional Toxics Advisory Committee (SRTAC) was formed by Ecology as a replacement for the Spokane River Regional Toxics Task Force (SRRTTF) that was suspended on June 30, 2023. The SRTAC is to provide funding for projects to control sources of toxics to the Spokane River. IEP reached out to the team that developed the *Proposal to Pilot the Inadvertent PCB (iPCB) Pigment Resource to Develop Low or Zero iPCB Inks for Printing QAPP* (reference Appendix C) and confirmed that all stakeholders are interested in continuing this effort. IEP along with these stakeholders will be applying for funding of this project and if successful intend to complete the scope of work by the conclusion of the funding period on June 30, 2026. IEP is confident that this project will demonstrate viable non-chlorinated ink and pigment alternatives that can be used to provide a more environmentally friendly substitution. These results can be used to support Ecology's efforts under the Safer Products for Washington program discussed in *Section 5.3 TSCA Reform* above.

5.5 REGULATORY TOOLS

Variances

Regulating agencies acknowledge that there are currently no technical or economical means for dischargers to attain the applicable PCB water quality criteria, and have recommended variances as a regulatory option to NPDES permits faced with PCB water quality compliance.⁹ In response to this recommendation, IEP along with the four other Spokane River NPDES permit holders filed for variances to the PCB water quality criteria in 2019.¹⁰

A brief review of the variance process is detailed in Section 6.5. The process was put on hold indefinitely when, on November 14, 2022, the EPA Administrator signed the final rule to restore the federal human health water quality criteria for the state of Washington that includes a PCB criterion of 7 ppq.¹¹

⁹(https://www.ezview.wa.gov/Portals/_1962/Documents/SpokaneRiverCleanWater/Spokane%20River%20Permit%20Tools%20Workshop%20232%20-%20Niemi_Full.pdf)

¹⁰ Department of Ecology, April 2019. Variance Application for Inland Empire Paper Company NPDES Permit No. WA 000082-5. Available at: <https://fortress.wa.gov/ecy/ezshare/wq/standards/IEPApp.pdf>

¹¹ <https://www.epa.gov/wqs-tech/federal-human-health-criteria-washington-state-waters>

Furthermore, EPA recently announced that it intends to use the Spokane Tribal water quality standard of 1.37 ppq in the development of a PCB TMDL for the Spokane River. Considering that the original variance applications were submitted with a PCB criterion of 170 ppq, the use of variances in the current context is justifiable because both the Washington State PCB water quality standards and the criteria for the Spokane River PCB TMDL are more stringent.

IEP will continue to evaluate the benefits of the other actions described herein prior to considering revising its application for a variance and requesting Ecology's consideration of this action.

6.0 PREVIOUS PMP TASKS AND IMPLEMENTATIONS

6.1 ADVANCED TREATMENT TECHNOLOGY (2011-2024)

2024 Status Update:

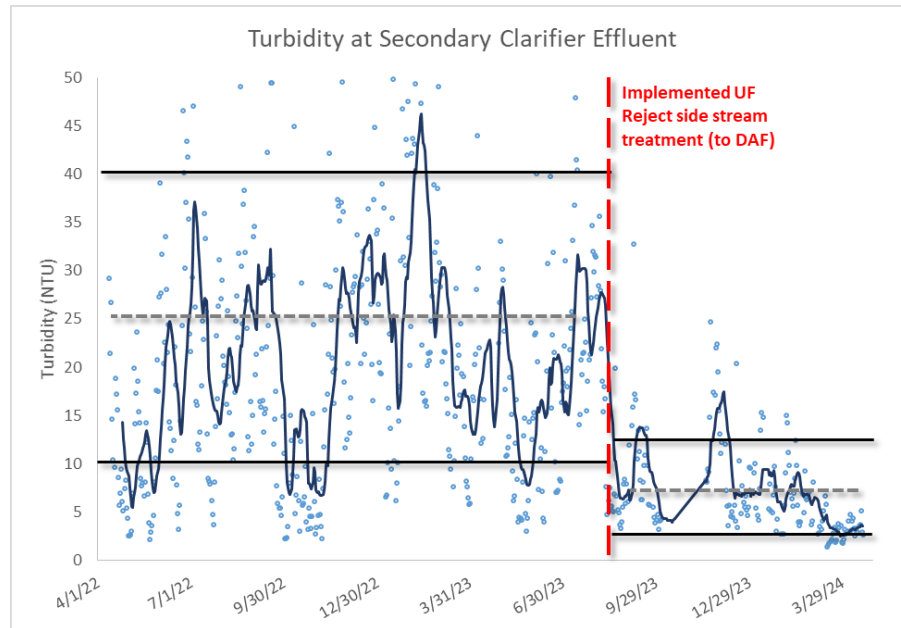
Secondary Treatment

IEP has committed to a multi-million-dollar upgrade to the aeration equipment in the activated sludge portion of secondary treatment to maximize BOD removal. Industry standard fine bubble aeration will replace the existing surface discs. The project will also convert a portion of the activated sludge from a well-mixed bioreactor to a plug-flow bioreactor, enhancing microbial growth and stability. The project is aggressively scheduled for completion in early 2025 for purposes of compliance with the DO TMDL water quality based effluent limits. Once finished, IEP will have maximized the amount of BOD processing capability (and, by extension, PCB reduction) using existing infrastructure. A break-in period for optimization, especially to allow the microbial biomass to acclimate and to find optimal operating conditions is expected to take some time.

Mitigation of Internal Process Water Recycling of PCBs

As stated above, IEP's state-of-the-art water treatment system is exceptional at removing PCBs, with the UF membrane system being the barrier for removal of 100% TSS and associated PCBs through filtration and absorption to solids. However, in the original design, rejects from the UF system were reintroduced to IEP's headworks, a common practice with all membrane separation systems, with the assumption that they will be removed in the primary and secondary sludge removal systems. That assumption proved to be problematic, however, as it resulted in accumulation of solids and other constituents (including PCBs adsorbed to the solids) with no effective pathway for escape. This manifested as high turbidity and suspended solids at the secondary clarifier, and created inconsistent and disruptive operation of IEP's WWTS

IEP implemented a project in 2023 to divert the UF rejects to its dissolved air flotation (DAF) system to provide these finer solids and PCBs an effective pathway out of IEP's WWTS. Solids removed from the DAF are sent to the sludge processing system and ultimately to IEP's fluidized bed combustion system for incineration and ultimate destruction of PCBs. The graph below shows the improvement in turbidity that occurred following the implementation of this project.



Consistent with IEP's overall approach to wastewater treatment and technological performance, by supporting optimization and improvements to IEP's secondary and tertiary efficiency, PCB mitigation has been supported as well. This PMP action is deemed complete.

2023 Status Update:

Mitigation of Internal Process Water Recycling of PCBs

IEP's state-of-the-art water treatment system is exceptional at removing PCBs, with the UF Membrane system being the barrier for removal of 100% TSS and associated PCBs through filtration and absorption to solids. However, rejects from the UF system are reintroduced to IEP's headworks, a common practice with all membrane separation systems, with the expectation that they will be removed in the primary and secondary sludge removal systems. IEP suspects that this is not an effective method for efficient abatement of PCBs considering that they were transported through the effluent system the first time and were not removed by these primary and secondary systems and believes that they are continually recirculated and increase in concentration over time. IEP is implementing a project in 2023 to send the UF rejects to its dissolved air floatation (DAF) system to provide these finer solids and PCBs an effective pathway out of IEP's water treatment system. Solids removed from the DAF are sent to the sludge processing system and ultimately to IEP's fluidized bed combustion system for incineration and ultimate destruction of PCBs. If successful, IEP will then evaluate the effectiveness of this PCB removal project.

2022 Status Update:

IEP did not submit a status update report for 2022 because of the transition to the new NPDES permit (effective August 1, 2022). The report requirements were significantly

updated (see Sections 1.0 and 3.2) and re-characterized as a Pollutant Minimization Plan (PMP) instead of a Best Management Plan (BMP). The first report under the new terms was submitted by IEP on August 1, 2023.

2021 Status Update:

IEP continues to optimize operation of the most advanced wastewater treatment system in the pulp and paper industry that should ultimately result in further reductions of PCBs. As stated in the 2020 Status Update below, IEP's state-of-the-art wastewater treatment system is already removing over 99% of the PCBs that enter its facility through the recycling of paper products. IEP then thermally destroys these PCBs in its fluidized bed energy system, thus eliminating them from entering the environment through other pathways.

2020 Status Update:

In January 2020 a tertiary ultrafiltration membrane system was commissioned, making IEP the first pulp and paper mill to treat 100% of its effluent using membrane technology. This state-of-the-art water treatment technology uses microscopic filtration (nominal pore size of 0.01 micron) to remove essentially 100% of total suspended solids (TSS). Most PCB congeners, especially those with higher molecular weights that are more persistent and toxic, have an affinity for solids so IEP's holistic effluent treatment system is very effective at abating PCBs.

To support justification of the highest attainable condition (HAC) for a variance application filed with Ecology on April 30, 2019, IEP performed an assessment on the effectiveness of its effluent treatment system for the removal of PCBs. The study entitled *Evaluation of Polychlorinated Biphenyl Reductions as a Basis for the Determination of IEP's Highest Attainable Condition* is submitted as a separate document for reference with the 2020 PCB BMP Plan Update for RY2020. The purpose of this study was to support the development of the HAC for removal efficiency of PCBs with IEP's advanced wastewater treatment system (WWTS) at varying paper recycling percentages and blends.

The study found that IEP's holistic treatment system is removing over 99% of PCBs when IEP is processing recycled paper regardless of the concentration of PCBs entering the system. A significant outcome from the study shows nearly 100% removal of the heavier molecular weight PCBs (tetra thru deca-chlorinated biphenyls) that are known to be more persistent, bio-accumulative and toxic than the lower level homologs. IEP will continue to optimize system operations and intends to conduct future studies to further quantify the effectiveness of its treatment for abatement of PCBs.

2019 Status Update:

On April 30, 2019, IEP submitted an application to the WA State Department of Ecology requesting a modification to the water quality designated use for fish harvesting to establish a variance based on the level of treatment for PCBs that IEP can achieve through the use of advanced process water treatment systems. IEP requested a variance on the basis that

attaining applicable numeric water quality standards and designated use for fish harvesting is not feasible as defined by 40 CFR § 131.10(g)(3): *Human caused conditions or sources of pollution prevent the attainment of the use and cannot be remedied or would cause more environmental damage to correct than to leave in place.* As a condition of this variance application, IEP will perform a PCB removal study of the tertiary UF membrane system to establish its abatement efficiencies as the basis for determining the highest attainable condition (HAC) for this advanced treatment technology. Installation and commissioning of the UF system is expected to be complete by the end of 2019, so IEP anticipates that the PCB removal study can be conducted after system optimization in 2020 with results available sometime in early 2021.

IEP also made several significant adjustments in 2019 to the operation of its existing water treatment system, potentially eliminating the need for tertiary MBBRs (see 2018 Status Update). As is evidenced by the graph below, maximum PCB absorption is obtained when the soluble biodegradable material in the wastewater is reduced:

To optimize removal of soluble organics and subsequently PCBs, the following changes to operation of IEP's WWTS were made:

1. Two (2), one-million-gallon equalization tanks were commissioned in the 3rd quarter of 2018. These tanks normalize the flow and organic loading to the secondary biological system, resulting in more stable and reliable performance. Optimization of this process will continue into 2020.
2. IEP's wastewater is nutrient deficient for effective biological treatment of organic matter, requiring the addition of supplemental nitrogen and phosphorus nutrient sources. In addition, the organic loading to the effluent system is highly variable due to frequent grade changes in paper production. The protocol for nutrient addition was modified from a constant flow-paced dose to a variable flow-paced dose that maintains a constant ratio with increases or decreases in organic loading. In conjunction with this new protocol, IEP is also considering the installation of online nutrient monitors to further improve control and ensure sufficient nutrients throughout the entire biological process.
3. IEP also added aerators and mixers to the biological oxidation channel of its Orbal Aeration Basin in order to promote more efficient and homogenous uptake of organic matter. IEP is also considering fine-bubble aeration to replace surface aerators to make the system more efficient and add treatment capacity for the future.

2018 Status Update:

IEP has solicited and received a firm bid proposal from WesTech for full-scale tertiary treatment utilizing MBBR and membrane technologies. IEP has begun engineering and anticipates installation of the equipment in 2019 with commissioning and start-up scheduled for 2020. The technology selection of two MBBRs in series followed by WesTech/Toray's ultra-filtration membranes has provided the best performance of all

tertiary treatment systems modeled at IEP to date. This selection of tertiary treatment technology combined with IEP's Delta Elimination Plan has the best opportunity to provide reasonable assurance to comply with the final WQBELs. After trialing over twenty five advanced treatment technologies, IEP believes that this also represents the best available control technology for the removal of PCBs.

2017 Status Update:

Based on the results from simultaneous operations of the WesTech membrane system and the AlgEvolve/Koch membrane in 2015-2016, it was decided to discontinue testing around the AlgEvolve/Koch system and focus tertiary trials around the WesTech system. Membrane operations alone will not achieve compliance with the Spokane River DO TMDL, so in 2017, IEP installed two series tertiary MBBR tanks. These tanks were fed by the secondary clarifier and the MBBR effluent was filtered through the WesTech membrane system prior to discharge.

Two rounds of PCB analyses were performed on the MBBR/WesTech system. The first round was completed with composite samples collected on June 15 following the installation and startup of the MBBRs and WesTech membrane system. The second round of composite samples was pulled on July 18 following a month of steady-state operations. IEP completed the PCB analysis using EPA Method 1668C with AXYS Analytical Services. Samples were collected at the following locations: Feed to the MBBRs (Feed) and discharge from the WesTech system (Permeate). The table below summarizes the results:

	Round 1 - Start Up		Round 2 - Operations	
	Feed	Permeate	Feed	Permeate
	pg/L	pg/L	pg/L	pg/L
Total Monochloro Biphenyls	103	84.4	131	97.4
Total Dichloro Biphenyls	715	729	814	459
Total Trichloro Biphenyls	595	295	551	263
Total Tetrachloro Biphenyls	407	199	335	116
Total Pentachloro Biphenyls	55.1	75.1	67.2	45.5
Total Hexachloro Biphenyls	53	49.1	18	16.6
Total Heptachloro Biphenyls	19.3	3.07	0.71	U
Total Octachloro Biphenyls	5.55	3.26	U	U
Total Nonachloro Biphenyls	U	2.84	2.6	1.85
Total Dechloro Biphenyls	U	2.71	1.56	U
Total PCBs	1,950	1,440	1,920	999

U = not detected at Reporting Limit
All values are uncorrected values

The data above indicates the importance of biological assimilation of PCBs prior to filtration. The “startup” sample was pulled after initial operations commenced, a time when the membrane was fully functional, but the MBBRs were not fully seeded with biology. The system was able to remove approximately 26% of the PCBs from the feed stream. The combination of a fully functional biological system with membranes was able to remove approximately 48% of the PCBs from the feed stream; therefore showing that the biology was able to remove an additional 29% of PCBs from the system. However, as with the AlgEvolve/Koch trials, the final permeate is still not remotely compliant with Washington’s new WQS of 7.0 pg/L.

6.2 ELIMINATION OF PAPER RECYCLING (2012-2024)

2023 Status Update:

IEP continues to evaluate the need to reduce or eliminate paper recycling as a means of PCB source control. As IEP experiences market flux and continuing change to consumer demands, it is unclear where the economic value of recycle fibers lies in comparison to environmental liability.

2022 Status Update:

IEP did not submit a status update report for 2022 because of the transition to the new NPDES permit (effective August 1, 2022). The report requirements were significantly updated (see Sections 1.0 and 3.2) and re-characterized as a Pollutant Minimization Plan (PMP) instead of a Best Management Plan (BMP). The first report under the new terms was submitted by IEP on August 1, 2023.

2021 Status Update:

Building on the foundation of the shift in consumer behavior due to COVID described below in the 2020 Status Update, IEP has expanded the marketing of its paper products into new markets that now include light weight packaging, All Recycled Content (ARC), brown paper products, etc. IEP now produces over 60 grades of different paper products, and now uses multiple recycled paper sources, including: Old Newsprint (ONP, Shredded Office Paper (SOP) and Old Corrugated Cardboard (OCC). With this expanded use of recycled paper products due to customer and consumer demand for recycled content, IEP sees increased dependency on recycled paper as a primary raw material in the manufacture of its products. Considering that IEP is the most modern facility of its kind with the most advanced wastewater treatment system in the pulp and paper industry, IEP believes that the recycling of paper and effective removal and destruction of PCBs provides the best alternative for both the beneficial reuse of this waste material and removal of PCBs from the environment.

2020 Status Update:

The COVID-19 Pandemic in 2020 shifted consumer behavior creating a new demand on paper products, including packaging for mail order shipments and food service. Included with this shift was a demand by customers for more recycled content in paper products. IEP adapted its production to support this shift in consumer behavior and help fill the demand of both new product growth and the desire for greater recycle content. The pulp and paper industry believes that this change in consumer behavior will likely be precedent setting and establish a new normal for future production and consumption. Based on this new market growth for IEP, recycle content will likely remain a key component to raw material supply with anticipation of potential growth in consumption.

As stated throughout this document, IEP believes that the preservation of recycling provides enormous environmental benefits and that correction of the TSCA allowance by EPA is necessary for correcting the paradox that exists with water quality standards. Additionally as summarized under *Section 4.2 Wastewater Treatment Improvements*, IEP has invested significant capital into being the most advanced treatment system for abating PCBs to exceptionally high levels and can responsibly process recycled paper products while minimizing the impacts of the TSCA allowance on the environment to a minimum.

It is IEP's intent that the actions taken under *TSCA Reform* and *Wastewater Treatment System Improvements* will allow IEP to continue to process recycled paper, thus significantly reducing the environmental impacts of PCBs allowable under TSCA versus that if IEP were to cease recycling.

2019 Status Update:

In 2018, China abruptly ceased accepting most shipments of recycled paper material from the USA in a policy known as the Blue Sky campaign, enforcing their import restrictions adopted under both the Green Fence and National Sword campaigns. This decision threw the recycled paper market into turmoil as many collection companies had nowhere to send their products and there were no additional domestic outlets to process this sudden surplus. Many recyclers are now paying to dispose of recycled paper.

IEP was approached by the Seattle University Albers School of Business and Economics who in collaboration with King County, WA were evaluating the Pacific Northwest paper recycling industry for domestic solutions to their paper recycling dilemma. On June 6, 2018, Seattle University published a report as a result of their research entitled "King County Paper Recycling Report." The report included a statement in recognition of the PCB concerns with paper recycling that will require resolution:

"PCBs are a leading concern in the processing of recyclables. Regulation, set forth at a federal level, limits the amount of PCBs in the byproducts of processing. The level is very strict, as PCBs are possible carcinogens and could be dangerous to the public and environment. However, this is not a product of current business practices. Mill and MRF operators are hurting because of past decisions made by manufacturers. Levels of PCBs are making the way through the eco-system from the 1970s. Mills are choosing virgin wood

over recycled paper to ensure the PCBs meet the requirement. If Washington wants to increase paper recycling capacity, it needs to conduct the research into PCBs to see if the level is fair to businesses.”

IEP, as a consumer of recycled paper, would normally be well-positioned to capitalize on the change in market, but continued pressure from PCB regulations and this BMP plan remain deterrents for increasing recycled fiber production. In the interim, until some relief or resolution to the PCB dilemma is found, IEP will continue to minimize its dependency on recycled paper as a raw material supply.

2018 Status Update:

There are many driving forces that have resulted in a reduction to the amount of paper recycled as a raw material source at IEP. These include a shortage in raw material supply, increased cost of recycled paper, decrease in quality, increased cost of disposal, safety concerns, and of course the environmental/regulatory factors associated with PCBs. Since 1991 with the installation of IEP’s integrated recycling facility, IEP has consistently averaged around 60% recycled paper consumption in its raw material supply to manufacture its finished paper products. Over the past eight (8) years the consumption of paper has steadily declined to approximately 20%.

Domestic processing of waste paper has become even more important due to China’s recent refusal to accept recyclable materials from the U.S. under the recently adopted Operation Green Fence campaign¹². Recyclables have been one of the largest exported materials to China; however the quality of the recyclables has decreased due to contaminants from U.S. single stream recycling programs. These contaminants cannot be recycled and Chinese manufacturers were getting stuck with a big expense to sort out and dispose of non-recyclables in Chinese landfills. Essentially, the Chinese, who were the largest consumer of recyclable materials in the world ceased taking in these materials from the U.S. This has caused a glut of waste paper and other recyclables being produced in the U.S. without a destination, much of which ultimately ends up in landfills.

IEP has been approached and encouraged by numerous U.S. municipalities to increase its consumption of domestic waste paper. However, the threat of PCB regulations has put IEP in an untenable position. While IEP embraces the many advantages of paper recycling, the company ultimately may not be able to continue this beneficial practice due to stringent water quality standards for PCBs:

Advantages for Continuing Recycling	Disadvantages for Eliminating Recycling
Can continue to offer recycled paper products (CA and other State Laws)	Lose market share of recycled paper products
Continue to be a U.S. destination for post-consumer paper waste	Waste paper sent to China, Landfill or Incineration
Provides raw material supply flexibility	Complete dependency on virgin wood fiber

¹² <https://www.theguardian.com/sustainable-business/china-green-fence-global-recycling-innovation>

Process up to 350 tpd of waste paper	Will need to source up to an additional 350 tpd of wood fiber
Remove and destroy +90% of PCBs received in inks	100% of PCBs may find a pathway into the environment
Uses 80 to 85% less energy to produce a ton of fiber	Significant increase in energy consumption
Low carbon footprint	Could result in a carbon footprint increase up to 56%
Continue leadership role in finding solutions to TSCA Paradox	No incentive to pursue TSCA solutions
Continue participation and leadership role in SRRTTF	No incentive to continue participation in SRRTTF
Offer a domestic destination for U.S. municipalities to dispose of waste paper due to China's Green Fence	Waste paper will not be recycled due to a lack of domestic sources such as IEP to process

It is difficult to estimate the magnitude of PCB reductions in IEP's effluent resulting from this decrease in recycle content, since there is no comparative and reliable data using low level detection methods prior to this permit cycle when IEP was operating at much higher recycle content. However, considering that IEP has identified recycled paper as the primary contributor of PCBs to its facility, it is intuitive that this percentage of recycled paper reduction equates to similar reductions of PCBs in IEP's final effluent. IEP's state-of-the-art processes remove and destroy the majority of PCBs coming into its facility. It is expected that a significant amount of any remaining PCBs in IEP's effluent will be removed and destroyed with the installation of advanced tertiary treatment systems required to comply with the Lake Spokane and Spokane River Dissolved Oxygen TMDL. Additionally, IEP has supplanted approximately 50% of its recycled paper supply with shredded office paper (SOP) that contains less ink and is perhaps lower in PCB containing inks and pigments, likely resulting in a lower overall PCB contribution to IEP's effluent system.

6.3 TSCA REFORM (2012-2024)

2023 Status Update:

Strengthening Inadvertent PCB Regulation through Citizen Petition under Section 21 of the Toxic Substances Control Act

IEP has taken a leadership role in the addressing the discrepancy that exists between the TSCA and CWA regulations and participates as Chair of the iPCB/TSCA Workgroup under the Spokane River Regional Toxics Task Force (SRRTTF). Under this workgroup, a study was devised with the goal *to reduce or eliminate the TSCA allowance for inadvertently produced PCBs in the environment by petitioning EPA to review the current limits*. The objectives of this project were to:

- 1) Evaluate methods for petitioning EPA to reevaluate the TSCA allowance for iPCBs with the intention of reducing or eliminating the allowance for inadvertently generated PCBs and determine whether those methods are feasible.
- 2) Provide direction to the SRRTTF regarding the methods evaluated, feasibility, and the most appropriate approach to pursue.
- 3) Develop a specific strategy, stepwise approach, and schedule for filing a Section 21 petition with EPA to reduce or eliminate the allowance for iPCBs. Include a timeline for the process, provide options (where available), and a list of considerations to assist in evaluating those options.

The project was awarded to AKWA-DC LLC (<https://akwadc.com/>), a policy consulting group specializing in the development of analyses and strategies on public policy processes. In response to this project AKWA-DC prepared a report entitled *Strengthening Inadvertent PCB Regulation through Citizen Petition under Section 21 of the Toxic Substances Control Act*.¹³

In the process of developing information to support this process, AKWA-DC interviewed key Federal and State Regulators, Legislators and many other subject matter experts. AKWA-DC was able to confirm *that EPA remains opposed to closing the existing allowance for inadvertently-generated PCBs and that EPA currently cannot offer any recommended solutions to stakeholders hoping to resolve this conflict*. The report essentially offers the following conclusions:

The Spokane Regional Toxics Task Force can develop and submit a petition under Section 21 of TSCA to close the iPCB allowance, but for such a petition to succeed, the Task Force will have to make a strong case for unreasonable risk presented by iPCBs using data regarding both toxicity and exposure of iPCB congeners. While the likelihood of a Section 21 petition succeeding is low due to the high bar EPA sets for granting such petitions, an unsuccessful petition combined with an aggressive advocacy strategy may bring pressure to bear on EPA to develop workable solutions for Spokane River stakeholders. In summary, a Section 21 petition to close the iPCB allowance is unlikely to succeed but may still hold value as a policy exercise to draw greater attention to the existing and currently unresolvable conflict between TSCA and CWA.

The report also notes: *if the petition is denied, the petitioners may commence a civil action in district court to compel the Administrator to initiate a rulemaking as requested in the petition. The petitioner must do so within 60 days of the petition's denial, or, if the Administrator neither grants nor denies the petition, within 60 days after the expiration*

¹³ SRRTTF, 2023. Strengthening Inadvertent PCB Regulation through Citizen Petition under Section 21 of the Toxic Substances Control Act. AKWA-DC. Available at: https://srrttf.org/wp-content/uploads/2023/06/4a-05.30.23-SRRTTF-TSCA-Section-21-Petition-Roadmap_GJComments_aer.pdf

of the 90 period that began when the petition was submitted. Petitioners who pursue civil action to compel EPA to act shall be given an opportunity to have their petition considered in a de novo proceeding, meaning the court will review the petition with “fresh eyes” and without consideration of EPA’s prior denial of the petition.

This report should inform Ecology’s actions to petition EPA as directed under Senate Bill 5369 and IEP intends to work closely with Ecology during this process to assure the best opportunity for success, both during and after the petitioning process.

2022 Status Update:

IEP did not submit a status update report for 2022 because of the transition to the new NPDES permit (effective August 1, 2022). The report requirements were significantly updated (see Sections 1.0 and 3.2) and re-characterized as a Pollutant Minimization Plan (PMP) instead of a Best Management Practice (BMP). The first report under the new terms was submitted by IEP on August 1, 2023.

2021 Status Update:

IEP continues to take a leadership role in the Spokane River Regional Toxics Task Force (SRRTTF) and chairs the iPCB (Inadvertent PCB)/TSCA workgroup. The workgroup is tasked with finding technical, legal, and regulatory solutions to the federally allowable inadvertent generation of PCBs in consumer products and had the following accomplishments in 2020:

1. **TiO₂ PCB Study** - the Titanium Dioxide Stewardship Council (TDSC) agreed to conduct a PCB study of TiO₂ pigments using EPA Method 1668 in cooperation with the SRRTTF. The purpose of the study is to determine if PCBs are present in TiO₂ pigments which the industry disputes since the processes used to manufacture these pigments are not conducive to PCB formation. Four (4) groups of high volume/potential TiO₂ pigments used in products with a nexus to the Spokane River nexus were tested: Paints & Coating, Plastics, Paper Products and Personal Care Products (used in sunscreens, cosmetics, etc.). The results of the study were presented to the SRRTTF at the September, 2021 advisory committee meeting (http://srtrtf.org/wp-content/uploads/2021/09/3-2021-0922_TiO2_SRRTTF_Presentation.pdf). The results showed levels of PCBs in the parts per billion range, ranging from 0.086 in paper and paperboard to 1.458 in paints and coatings. Considering that these values are orders of magnitude higher than the PCB water quality standard and their prevalence of use in many consumer products, it is likely that TiO₂ is a source of PCBs to the Spokane River. Subsequent studies to better characterize the impacts of TiO₂ to the Spokane River will be considered by the iPCB/TSCA workgroup.
2. **Education & Outreach** – as an outcome from the iPCB Workshop held in 2019, the iPCB/TSCA workgroup in cooperation with the Education & Outreach workgroup advanced a national campaign effort to inform other state governments and businesses on the implications of iPCBs. This campaign is being developed under the guidance of the

iPCB/TSCA workgroup. A draft of the iPCB National Campaign effort was presented to the SRRTTF at the October, 2021 meeting (<https://www.ipcbfree.org/>). Further development and implementation of the iPCB National Campaign effort will continue into subsequent phases.

3. The iPCB/TSCA workgroup initiated the *PCB-11: Sources and Pathways to the Spokane River* project in 2021. Research on PCB-11 is needed due to its significance in the Spokane River watershed as the most prominent congener found in the water column. LimnoTech, the Technical Advisor to the SRRTTF performed the study and found that PCB-11 concentrations are essentially indistinguishable from blanks in upper portion of study area (i.e., Upriver Dam and upstream), but PCB-11 concentrations in the lower portion of study area are at levels greater than can be explained by known loading sources. Subsequent phases of this study will be performed in an effort to identify the unknown sources in the lower portion of the study area.
4. The iPCB/TSCA workgroup also initiated the *Lower Procurement Limits Campaign, Phase 1: 3rd Party Research Effort*. The desired outcome of this study is an evaluation of current PCB procurement strategies that will help inform SRRTTF efforts going forward. Success and improvement in the implementation of PCB procurement limits could encourage demand-driven innovation in the markets for lower PCB containing products. This project was awarded to Braided River Consulting with an expected completion in Spring, 2022.
5. Another project initiated by the iPCB/TSCA workgroup is to Develop Industry List of Pigments: Chlorinated vs. Non-Chlorinated. This project will provide an important resource in helping to understand which pigments could contain iPCBs. Additional work will be necessary to confirm their presence once the list of chlorine containing pigments is compiled. Eventually, this information along with other supporting data can be provided to interested parties to allow them to make informed decisions. The information will also be used to investigate how pigments without a high prevalence of iPCBs might be used as an alternative in specific applications. Proposals were received from Gonzaga University, ChemForward and Non-Toxic Certified (MadeSafe). A Selection Committee will determine the preferred bidder for approval by the SRRTTF at the December, 2021 meeting.

2020 Status Update:

IEP continues to take a leadership role in the Spokane River Regional Toxics Task Force (SRRTTF) and chairs the iPCB (Inadvertent PCB)/TSCA workgroup. The workgroup is tasked with finding technical, legal, and regulatory solutions to the federally allowable inadvertent generation of PCBs in consumer products and had the following accomplishments in 2020:

6. **Yellow Road Paint Project** - a whitepaper by Northwest Green Chemistry and a third party technical journalist, Sonja Elmquist, summarizes a project by the iPCB/TSCA workgroup that resulted in the elimination of diarylide yellow pigments in road paints in

WA State. The whitepaper is included in Appendix G of this report. Next steps include evaluation of the purchasing policy's effectiveness, adequate supplier concerns and quality of the non-diarylide yellow paints in use. Assuming successful use of non-diarylide yellow road paints in WA, future projects may include expanding use to other State and Federal transportation programs.

7. **TiO₂ PCB Study** - the Titanium Dioxide Stewardship Council (TDSC) agreed to conduct a PCB study of TiO₂ pigments using EPA Method 1668 in cooperation with the SRRTTF. The purpose of the study is to determine if PCBs are present in TiO₂ pigments which the industry disputes since the processes used to manufacture these pigments are not conducive to PCB formation. Four (4) groups of high volume/potential TiO₂ pigments used in products with a nexus to the Spokane River nexus are to be tested: Paints & Coating, Plastics, Paper Products and Personal Care Products (used in sunscreens, cosmetics, etc.). A Quality Assurance Project Plan (QAPP) was developed for the study and all sampling and laboratory testing was completed in 2020. An evaluation of the results and a final report are due in 2021.
8. **Education & Outreach** – as an outcome from the iPCB Workshop held in 2019, the iPCB/TSCA workgroup in cooperation with the Education & Outreach workgroup advanced a national campaign effort to inform other state governments and businesses on the implications of iPCBs. This campaign will be promoted and executed by the Education and Outreach Workgroup in 2021.
9. **Green Chemistry** – it was determined that the iPCB/TSCA workgroup would assume responsibilities for promoting and implementing work associated with Green Chemistry efforts (previously SRRTTF Green Chemistry Workgroup) since the scope of the iPCB/TSCA Workgroup has evolved to include such efforts (i.e.: Yellow Road Paint Project). The iPCB/TSCA workgroup is currently identifying bio-based alternatives for inks and pigments (i.e.: Living Ink, Colorifix, KBCols Sciences, Cypris Materials, etc.), developing a list of non-chlorinated pigments (see 2021 Projects below) and working with synergistic trade organizations (Sustainable Packaging Coalition, Healthy Printing Initiative, Cradle to Cradle Certification, etc.).
10. **Potential Future Projects** – the iPCB/TSCA workgroup developed and prioritized the following projects for implementation in 2021 that meet the goals of the SRRTTF to identify and reduce sources of PCBs to the Spokane River:

Proposed iPCB/TSCA Workgroup Project Description
Develop Industry List of Pigments (Chlorinated vs. Non-Chlorinated)
Newsprint/Graphic Printing Trials w/Non-Chlorinated Inks/Pigments
Further Develop iPCB Education & Outreach Campaign Objectives

Lower Procurement Limits Campaign, Phase 1 - 3rd Party research effort
Sources & Pathways of PCB-11, Phase 1 - 3rd Party research effort
Petition EPA to enforce PCBs in products under TSCA
Petition EPA to perform Cost/Benefit Analysis and reevaluate TSCA

2019 Status Update:

IEP continues to take a leadership role in the Spokane River Regional Toxics Task Force (SRRTTF) and chairs the iPCB (Inadvertent PCB) workgroup (AKA the TSCA workgroup). The workgroup is tasked with finding technical, legal, and regulatory solutions to the federally allowable inadvertent generation of PCBs in consumer products and had the following accomplishments in 2019:

1. **Yellow Road Paint Project** - development of a whitepaper by a 3rd party journalist that summarizes an iPCB workgroup project that resulted in the elimination of diarylide yellow pigments in road paints in WA State (this project is described in more detail under the “2018 Status Update”). The whitepaper is scheduled for completion in 2020.
2. **TiO₂ PCB Study** - the Titanium Dioxide Stewardship Council (TDSC) agreed to conduct a PCB EPA Method 1668 study of TiO₂ products and wastes in cooperation with the SRRTTF. Four (4) groups of high volume/potential TiO₂ products with a nexus to the Spokane River nexus are to be tested: Paints & Coating, Plastics, Paper Products and Personal Care Products (used in sunscreens, cosmetics, etc.). A Quality Assurance Project Plan (QAPP) is currently under development and the study is expected to commence in 2020.
3. **iPCB Workshop** - a workshop was held in October 2019 to address the ongoing difficulties of reconciling TSCA allowable PCB limits with Washington State water quality-based effluent criteria. Stakeholders from state and federal agencies, municipalities, environmental groups, academia, recycled paper industry, and most notably inks and pigments manufacturers were also in attendance. Collaborative discussions focused on market drivers for PCB-containing inks and regulatory policy that resulted in the following outcomes:

Suggestion #1: Develop/Use Alternatives to PCB-Containing Products:

The trace amount of PCBs that are present in various pigments are not used in the manufacture of these pigments, but are inadvertently produced as a by-product through the complex reaction of chlorinated solvents used in the manufacturing process. Alternative methods using non-chlorinated solvents are available to manufacture pigments that are currently produced using chlorinated solvents in some cases.

Suggestion #2: Reduce the TSCA/Global Allowance for PCBs:

Modify the TSCA regulations to reduce the allowable levels of PCBs in products from the current 50 ppm maximum/25 ppm average to a lower threshold. Industry experts believe that most of the pigments manufactured today using improved quality control methods can be produced at much lower levels than the current TSCA allowance. This will likely require global consideration since most pigments are manufactured outside the U.S. Suggest working with pigment manufacturers to establish a lower, more reasonable PCB allowance standard that is consistent with modern manufacturing methods.

Suggestion #3: Incentivize the Research and Development of Non-Chlorinated Alternatives:

The manufacturing of pigments used in paints and inks is an international industry. Most base pigments are manufactured overseas. Incentivize the international community to research and develop non-chlorinated alternatives to the current PCB containing products. Encourage pigment manufacturers to develop alternative manufacturing processes or eliminate certain PCB-containing pigments. In order to provide these incentives, we need to remove or reduce the regulatory constraints that currently make the development of new products prohibitively burdensome and expensive.

Suggestion #4: Reassess the Current Use Authorizations:

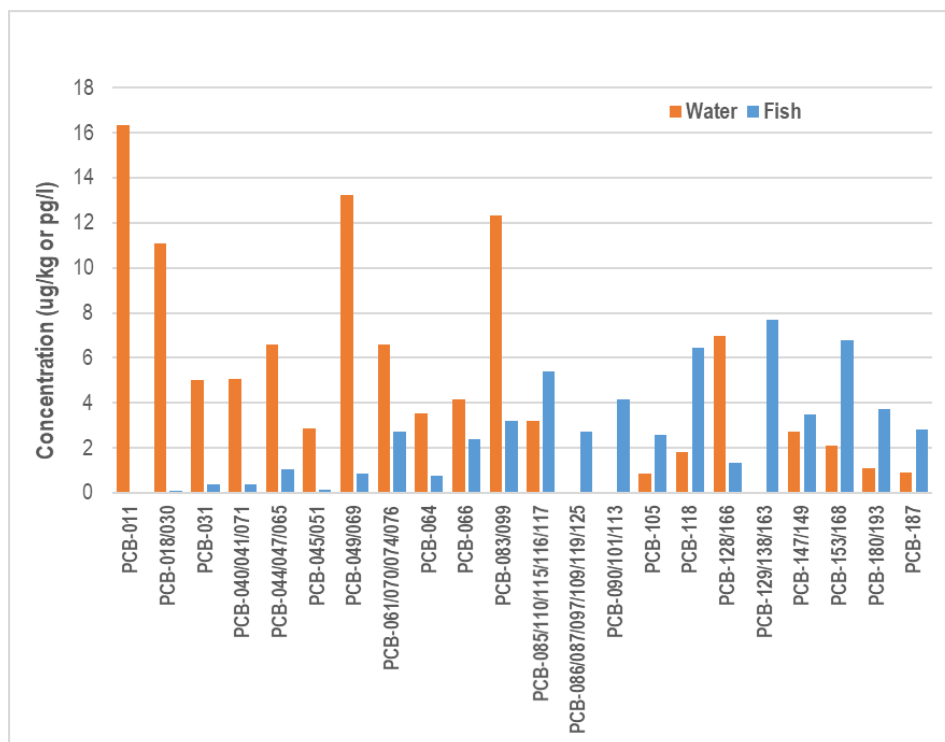
Reassess the current use authorizations for certain PCB uses to determine whether they may now pose an unreasonable risk to human health and the environment. Section 6(e)(2)(B) of the Toxics Substance Control Act (TSCA) provides EPA with the authority to issue regulations allowing the use and distribution in commerce of PCBs in a manner other than in a totally enclosed manner, if the EPA Administrator finds that the use and distribution in commerce will not present an unreasonable risk of injury to health or the environment. The 50 ppm level for excluded products in the TSCA regulations has allowed for the use of chemical products that have entered the ecosystem through the recycling process and other pathways that now present an unreasonable risk of injury to health and the environment. Therefore, U.S. EPA is obligated to make changes to its rules and regulations to protect human health and the environment.

Suggestion #5: Monochloro-biphenyls and Dichloro-biphenyls should be excluded from total PCB regulation:

Mono and dichloro-biphenyls have generally been regarded as having lower bioaccumulation and human health and environmental impacts than more highly substituted PCB congeners. Information published in peer reviewed literature and presented by U.S. EPA and the Agency for Toxic Substances and Disease Registry (ATSDR) shows that the physical/chemical properties of mono and dichloro-biphenyls do not favour the accumulation of these congeners in biological tissues, including fish, relative to more highly chlorinated PCB congeners. Further, these congeners generally play a smaller role in concerns over PCB contamination in aquatic systems. Research on the fate and transport of PCBs in the aquatic environment has established that the bioaccumulation of PCB

congeners in aquatic organisms including fish is related to the degree of chlorine substitution.

PCB congener data from the Spokane River published by the Washington State Department of Ecology indicates that mono and dichloro-biphenyls comprise a small component of total PCB found in fish. Work performed by the Spokane River Regional Toxics Task Force found that although lower congener levels were prevalent in the water column there was little to no bioaccumulation in fish tissue:



In addition to lower expected bioaccumulation, the level of human and environmental health concern attributed to mono and dichloro-biphenyls is generally also lower than that of more highly chlorinated congeners. For example, none of these congeners are among the 12 congeners identified by U.S. EPA as “dioxin-like” that are generally considered to pose the largest PCB related environmental and human health concerns. EPA, in a summary of conclusions from their 1996 cancer reassessment, states, “The types of PCBs that tend to bioaccumulate in fish and other animals and bind to sediments happen to be the most carcinogenic components of PCB mixtures.”

Further, in U.S. EPA’s “Guidance for Assessing Chemical Contaminant Data for Use in Fish Advisories,” only one of 18 congeners recommended for quantitation to support the development of fish consumption advisories is a dichloro-biphenyl (2,4’-CB, PCB-8). The recommendation to include this congener is based on a NOAA procedure for using congener data to estimate total PCB concentrations rather than on specific toxicity concerns. No mono- or dichlorobiphenyl congeners are identified as either first or second

priorities “for potential environmental importance based on potential for toxicity, frequency of occurrence in environmental samples, and relative abundance in animal tissues.”

A significant percentage of PCB congeners associated with the recycling process are monochloro, dichloro, trichloro and tetrachloro-biphenyls. The lower chlorine congeners are known to have lower toxicity and are not as persistent and bio-accumulative as higher chlorine congeners, resulting in a low potential for exposure to humans. Because of this low risk factor, monochlorinated and dichlorinated biphenyls are not regulated in the European Union and Canada.

If it is determined the environmental benefit of recycling outweighs that of not recycling, provide the recyclers of paper an offset or exclusion for PCBs attributable to those allowable under the TSCA regulations.

Suggestion #6: Holistic Regulatory View:

Challenge regulatory agencies to consider a more holistic view of the environmental, time-cost-benefit and socio-economic effects of implementing their conflicting regulations (TSCA/CWA, State recycling laws/WQS, etc.). Agencies need to set attainable regulatory goals/standards to incentivize industry to drive technological solutions. Agencies need to perform cradle-to-grave life cycle assessments to determine overall environmental benefit.

Suggestion #7: Market Drivers:

Encourage end-users to adopt policies for printed materials to use alternative ink and pigment formulations that are non-chlorinated thus reducing the potential for PCBs in their finished products.

Encourage end-users to adopt purchasing policies with lower PCB thresholds for products both purchased and manufactured by their companies.

Educate all of those along the supply chain on this issue and encourage reducing the potential for PCBs in their finished products.

Increase public awareness of this issue to provide consumers with options for purchasing products with reduced levels of PCBs.

2018 Status Update:

Since EPA has refused to address the TSCA allowance for inadvertently generated PCBs, IEP has taken a leadership role independently and through the Spokane River Regional Toxics Task Force (SRRTTF) to find alternative solutions in addressing this concern. IEP has been working with various color pigment, paint and ink trade organizations to develop collaborative solutions in lowering concentrations in their manufactured products or offer non-chlorinated alternatives to the PCB containing products currently used in commerce. In addition to these efforts, IEP is the Project Manager for the SRRTTF TSCA workgroup

tasked with finding technical, legal and regulatory solutions to the federally allowable inadvertent generation of PCBs in consumer products. The above combined efforts have resulted in the following successes and/or progress in driving solutions to this concern:

1. **Yellow Road Paint Pilot:**

Members of the TSCA workgroup worked with the American Coatings Association (ACA) to eliminate the use of diarylide yellow pigments in road paints in WA State. In 2018, the Washington State Department of Transportation (WSDOT) adopted a procurement specification that excludes the use of known PCB containing yellow road paint processes. Municipalities with a nexus to the Spokane River also followed suit in adopting similar ordinances. WA State's Department of Enterprise Services (DES) used WSDOT's master contract as a pilot to implement the new PCB Purchasing Policy for WA State (RCW 39.26.280-290).

2. **Printing Inks Pilot (Packaging/Newsprint):**

Similar to Task #1 above, the TSCA workgroup is continuing its work with the Color Pigment Manufacturers Association (CPMA) and others towards the development of non-chlorinated pigment based inks for use in the publishing of newspaper, magazines, advertisements and packaging. This scope of work may include running trials with select publishers to assess the characteristics of alternative non-chlorinated products.

TSCA workgroup members are also working with representatives from the printing and packaging industries to raise awareness of the inadvertent PCB containing inks concern. Suppliers such as HP & Apple have modified their purchasing and product specifications to 0.1 ppm, several orders of magnitude below the TSCA allowance of 50 ppm. The updated HP Standard 011 General Specification for the Environment has been published (<http://h20195.www2.hp.com/V2/GetDocument.aspx?docname=c04932490>) and Apple also adopted a Regulated Substances Specification in 2016 with a non-detect threshold set at < 0.1 ppm (<https://www.apple.com/supplier-responsibility/pdf/Apple-Regulated-Substance-Specification.pdf>).

3. **Investigate Technical, Legal and Policy Solutions:**

TSCA workgroup members continue to investigate the Technical, Legal and Policy Solutions document (Appendix D) to determine what, if any, may be worth pursuing. This includes ranking the solution list according to feasibility, resources and timing, then pursuing any feasible options.

4. **PCB Congener and Aroclor Risk Assessment:**

The SRRTTF submitted a letter to EPA Regional Administrator Chris Hladick on May 9, 2018 (Appendix E) requesting an update to toxicity testing on PCB-11 supposedly started in 2015.

In response, EPA Regional Administrator Hladick provided a letter of response to the SRRTTF on September 24, 2018 (Appendix F). In this letter, EPA reported that the National Toxicology Program at the National Institute of Environmental Health Sciences is actually evaluating toxicity of PCB congeners 11, 95, 126, 153 and Aroclors 1016 and 1254. While no date has been provided for completion of this work, it remains encouraging that EPA is taking steps to evaluate the effects of certain congeners associated with inadvertently generated PCBs along with other congeners and Aroclors of interest.

5. **Workshop:**

The TSCA workgroup is developing plans for a future stakeholder workshop that includes participation by business, industry, and regulators to discuss and develop solutions to pigment related TSCA issues, including working with industry (HP, CPMA, ACA, etc.) to investigate inks and dyes alternatives, investigate various elements of the Solutions Document, etc. This workshop is tentatively planned for the spring or summer of 2019.

2017 Status Update:

On August 1, 2016, Ecology adopted revisions to Water Quality Standards for Surface Waters of the State of Washington and sent it to the federal Environmental Protection Agency (EPA) for review. On November 15, 2016, EPA took action to approve in part, and disapprove in part, the human health criteria submitted by Washington. In lieu of approving WA's special provision for PCB's that maintained EPA's 1999 National Toxics Rule (NTR) criteria (40CFR131.36) of 170 part per quadrillion (ppq), EPA imposed more stringent criteria equating to 7.0 ppq for WA State. It is apparent by this action that EPA has no intention of resolving the discrepancy that exists between the TSCA allowance for inadvertent PCBs, and in fact has created a more untenable situation by driving the two standards even further apart. With the weight of evidence displayed by EPA's actions over the past several years, the opportunity for TSCA Reform as a means for reducing PCBs in IEP's final effluent is not a viable option and will no longer be a pursuit action in this Best Management Practices Plan Update.

2016 Status Update:

On June 22, 2016, the Toxic Substances Control Act (TSCA) reform bill H.R. 2576 was signed by President Obama and entered into force. The bill expands the U.S. Environmental Protection Agency's ("EPA") ability to regulate chemicals, requiring it to evaluate their safety against new standards. The bill also requires EPA to adopt new testing procedures and compels it to assess the risks associated with high priority chemicals prior to certain predetermined deadlines. IEP and other entities lobbied congressional representatives to include provisions to address the inadvertent PCB allowance, but unfortunately were once again denied, so no provisions to address this element of TSCA are included.

IEP also worked with the Spokane River Regional Toxics Task Force (SRRTTF) to encourage EPA to address the TSCA regulatory paradox. The SRRTTF submitted a letter to EPA on October 23, 2013 (see Appendix A), requesting “that EPA ultimately eliminate the provisions under TSCA that allows for the continued manufacturing of products to contain inadvertently produced PCBs in order to ensure that our watershed can achieve State and Tribal water quality standards required under the Clean Water Act.” Additionally, the Task Force requested increased enforcement of the existing TSCA regulations regarding excluded manufacturing processes and excluded PCB products, as defined in 40 C.F.R. § 761.3 and further described in Subpart J of 40 C.F.R. § 761. EPA provided a response to the SRRTTF letter on February 24, 2015. EPA does not intend to amend the TSCA regulations to address inadvertently generated PCBs on the grounds of “both policy and scientific challenges.” Additionally, EPA declined to initiate enforcement of the regulation, citing numerous challenges including “the nature of the regulations, the EPA’s ability to identify possible non-compliers, the resources necessary to implement an effective enforcement initiative, and the potential of any such initiative to effectively reduce PCB levels to meet water quality standards.”

On October 14, 2016, members of the U.S. Senate submitted a letter to the U.S. Government Accountability Office (GAO) requesting the GAO’s assessment of regulations governing inadvertent PCBs (see Appendix C). The GAO provided a prompt response stating that they were unable to address this concern due to resource limitations.

It is evident from the above efforts that EPA and the Federal government have no intentions of providing front-end solutions to the TSCA and CWA inequities, or is there any intention of enforcing existing TSCA regulations. IEP along with other interested parties will continue petitioning for front end solutions to correct this allowance for new PCBs that are entering the environment.

The following provides annual summaries of the activities for the *Section 4.2 Wastewater Treatment System Improvements* efforts since the inception of this PCB Best Management Practices Plan (2015 to current). See *Sections 4.1 TSCA Reform* and *4.3 Elimination of Paper Recycling* for annual updates to those efforts:

6.4 SOURCE CONTROL (2018-2024)

2023 Status Update:

The iPCB/TSCA Workgroup developed a Pigment Resource for inks and pigments using non-chlorinated processes.

The iPCB/TSCA Workgroup contracted with ChemFORWARD to develop a resource that provides a comprehensive list of pigments used in commerce and whether those pigments were manufactured using a chlorinated or non-chlorinated process. Intuitively, those

pigments produced using non-chlorinated processes are likely to have much lower PCB concentrations than those produced using chlorinated processes. ChemFORWARD was selected as the successful organization to develop this tool due to their technical resources, an ability to host the resource on a website for public access, and a mission consistent with the goals of this project:

We are committed to creating broad access to chemical hazard data, illuminating safer alternatives, and ending toxic chemical exposure. We provide access to trusted comprehensive data, and offer benchmarking and reporting to help brands and retailers achieve measurable progress toward safer chemistry. We believe this will lead to human and environmental equity and enable a safe and circular economy.

The final Pigment Resource (<https://www.chemforward.org/ipcb-pigment-resource>) is a database to identify pigment alternatives that are not likely to contain inadvertently generated PCBs (iPCBs):

The iPCB Pigment Resource supports those who procure organic pigments for use in coatings, plastics, printing inks and many other products in identifying alternatives that are not manufactured with chlorinated solvents and/or do not have chlorine in their molecular structure, and are therefore unlikely to contain PCBs inadvertently generated during manufacturing.

The iPCB Pigments Resource is a free searchable dataset of nearly 400 pigments organized by chemical name, CAS#, color, and presence of chlorine. The tool can be used to find alternatives by avoiding those containing or manufactured with chlorine and thus reducing the likelihood of containing iPCBs. <https://www.chemforward.org/ipcb-pigment-resource-tool>

After completion of the Pigment Resource, the iPCB/TSCA workgroup then developed a project to put this tool into practice by assembling a team of publishers, and pigment and ink manufacturers to develop alternative non-chlorinated pigments and inks as replacements for current pigments and inks being used by publishers. The intent is to apply these alternative, non-chlorinated inks onto printed materials to evaluate all key parameters for printability and economic comparison. A Quality Assurance Project Plan (QAPP) was developed that provides a blueprint for the project to ensure that the project produces reliable data that can be used to meet the project's overall objectives and goals, *Quality Assurance Project Plan for Proposal to Pilot the Inadvertent PCB (iPCB) Pigment Resource to Develop No or Ultra-Low iPCB Inks for Printing*¹⁴

2022 Status Update:

¹⁴ ChemForward, June 22, 2023. Quality Assurance Project Plan, Proposal to Pilot the Inadvertent PCB (iPCB) Pigment Resource to Develop No or Ultra-Low iPCB Inks for Printing. Available at: https://srrttf.org/wp-content/uploads/2023/06/3-2023_06_14_ChemFORWARD-Pigment-Resource-Pilot-QAPP-with-resp-to-comments.docx.pdf

IEP did not submit a status update report for 2022 because of the transition to the new NPDES permit (effective August 1, 2022). The report requirements were significantly updated (see Sections 1.0 and 3.2) and re-characterized as a Pollutant Minimization Plan (PMP) instead of a Best Management Plan (BMP). The first report under the new terms was submitted by IEP on August 1, 2023.

6.5 REGULATORY VARIANCE (2018-2020)

If a discharger is unable to meet a given water quality criterion, a variance from the standard may be requested. In the consideration of many stakeholders, a variance provided a plausible pathway for regulated entities to come into compliance while still maintaining strict water quality standards. IEP, along with the other dischargers to the Spokane River watershed, submitted variance applications in 2019. As part of the application, IEP conducted a rigorous internal study to determine the highest attainable condition (HAC) based on the range of mill operations, most notably the amount of recycle content in the overall furnish.

Ecology began the review process and started rulemaking to adopt the variances to the PCB water quality standard in the Spokane River and filed a CR-101 to amend Chapter 173-201A WAC, Water Quality Standards for Surface Waters of the State of Washington on June 12, 2019.¹⁵ However, in June of 2020, Ecology announced that it was unable to move forward with the variance applications due to actions by EPA to reconsider and approve the science-based and protective standard adopted by Ecology in 2016 and withdraw the politically driven EPA standard imposed on Washington in 2016.¹⁶ Ecology stated that *“EPA’s roll back creates regulatory uncertainty that adversely impacts Ecology’s efforts to work with dischargers to meet the PCBs human health criteria.”* Ecology further acknowledges that *“None of the five dischargers produces PCBs. Rather, the dischargers redistribute PCBs that enter wastewater from historic sources and products like inks, caulk, and paint.”*

6.6 PMP QUALITY ASSURANCE PROJECT PLAN (2023-2024)

2024 Status Update:

The contract laboratory that IEP has relied upon for over a decade for sample analysis, SGS Axys in British Columbia, Canada, has stated early this year that PCB analysis via Method 1668 will no longer be offered after 2024. According to SGS, this is because the highly sensitive equipment (HRMS) is obsolete and due for replacement. PCB analysis will continue to be offered with newer updated equipment using GC-MS/MS

¹⁵ <https://ecology.wa.gov/getattachment/35e31cb8-7c0a-4ad3-b63c-69b3b7f62a70/WSR-19-13-030.pdf>

¹⁶ <https://ecology.wa.gov/about-us/who-we-are/news/2020/june-10-spokane-river-preliminary-draft>

methodology defined under EPA method 16130. However, Ecology has specified in S8.A.7 of IEP's active NPDES permit:

*...The QA/QC Plan must include a minimum testing frequency of once per quarter for routine monitoring of PCBs in the final effluent (Outfall 001) for effluent characterization using **EPA method 1668** [emphasis added]...*

Therefore, to maintain compliance with the permit as it is written, IEP will procure the services of an alternate contract laboratory in the latter half of 2024 to maintain PCB analysis as defined by EPA Method 1668. After which time, a revision of the current Quality Assurance Project Plan will be produced and submitted to Ecology.

2023 Status Update:

Effluent characterization of PCB data must be collected and analyzed in conjunction with a quality assurance and quality control (QA/QC) plan to ensure data reliability and usability. IEP has created a quality assurance project plan (QAPP), using Ecology guidelines in Publication 04-03-030, to serve this purpose. A brief summary of the plan includes the following elements:

- IEP collects grab samples of final effluent once per quarter
- Field duplicates are collected once per year
- The sample is analyzed using EPA Method 1668C (note that this method is not approved under 40 CFR Part 136)¹⁷
- External laboratories are responsible for method QA/QC
- Individual congeners measured below the detection threshold are excluded from summation for homologs, dioxin-like, Aroclors, and total PCBs
- When blank censoring is utilized, individual congeners with concentrations less than the field blank censor level are excluded from summation

6.7 SOURCE IDENTIFICATION SURVEY (2015)

IEP conducted a PCB source identification study in 2015 in compliance with Condition S6.A. of its NPDES permit. The intent of the source identification study was to aid in the development of Best Management Practices (BMPs) for addressing Polychlorinated Biphenyls (PCBs); Condition S6.B of IEP's previous permit (issued 11/1/2011). Direct language from that version of the NPDES permit relating to the PCB BMP was as follows:

The goal of the BMP plan is to maintain or lower effluent concentrations of PCBs through source control, pollution prevention and/or wastewater reduction opportunities.

The source identification study implicated the use of recycled paper within the facility as the primary source of PCBs to its wastewater treatment system. Unfortunately, one stated method from the NPDES permit (wastewater reductions) has had the opposite effect within

¹⁷ <https://www.epa.gov/cwa-methods/other-clean-water-act-test-methods-chemical#:~:text=Clean%20Water%20Act%20Analytical%20Methods,Related%20Information>

the facility and has compounded the PCB problem within process streams due to cross-contamination; further details of this issue are explored in the PCB source identification study.

6.8 WATER CONSERVATION AND REUSE (2004-2015)

IEP implemented the following significant water conservation, reclamation, reuse and wastewater reduction efforts in response to more stringent water quality based effluent limits (WQBELs) imposed by the Spokane River and Lake Spokane Dissolved Oxygen TMDL:

- a. **Conustrenner (2004)** – The Conustrenner is a compact highly efficient self-cleaning fractionation filter. Approximately 1-1.4 MGD of primary treated water is diverted to the Conustrenner for reclamation and reuse in the pulp mill processes, greatly reducing freshwater needs and volumetric loading to the water treatment system.
- b. **Pump Seals (2005 to 2007)** – Flow limiting devices were installed on mechanical seal water lines for numerous pumps around the mill. These devices greatly reduced freshwater consumption to the process streams resulting in a substantial decrease in the volumetric loading to the water treatment system.
- c. **Retention Aid Carrier Water (2012)** - IEP switched from using fresh water to reclaimed process water for its retention aid carrier water. This modification reduced treated effluent flow by approximately 100 gallons/minute.
- d. **Disk Filter Shower Water (2014)** – IEP's #1 Disk Filter showers were changed from fresh water to reclaimed process water. This modification reduced treated effluent flow by approximately 200 gallons/minute.
- e. **PM5 Vacuum Roll Seal (2015)** – IEP installed a new style of lubrication seal strip on the paper machine vacuum roll that reduced fresh water consumption and discharge by 10 million gallons/year.

The above projects resulted in a significant decrease to treated process water flows, but unfortunately have increased the technological difficulty in removing and reducing PCBs due to cross-contamination of all water loops within the mill.