

Proposal to Pilot the Inadvertent PCB (iPCB) Pigment Resource

Phase 1

2023_03_15

ChemFORWARD is pleased to submit this proposal to the Spokane River Regional Toxics Task Force (SRRTTF) to pilot the use of the online ChemFORWARD Pigment Resource ([LINK](#)) to replace ink formulations containing inadvertently generated PCBs (iPCBs) with those that should contain no, or ultra-low, concentrations of iPCBs from pigments. The ChemFORWARD Pigment Resource identifies pigments that are manufactured without the use of chlorinated solvents and that do not contain chlorine in their molecular structure. This work is proposed in phases and builds on the prior efforts of ChemFORWARD for the SRRTTF.

ChemFORWARD has convened a team of experts and practitioners including a pigment supplier, an ink manufacturer, a paper manufacturer and publishers of newsprint and paper packaging who will collaborate to:

1. Test currently used ink formulations for the presence of iPCBs,
2. Identify performance requirements and acceptable cost criteria for ink formulations,
3. Identify alternative pigments that should not contain iPCBs or have much lower levels,
4. Formulate new ink formulations that use the recommended alternative no/ultra-low PCB pigments and that meet performance and cost targets,
5. Test the new ink formulations for iPCBs, and
6. Compare the initial and revised formulations for cost and performance.

Partners include (See appendix for more detailed description of partners):

- Lewiston Morning Tribune/Revolve Print and Pack (Lewiston) (in-kind)
- Chroma Specialty Chemicals (Chroma team; i.e., Mark Vincent and Grace Manarang-Pena, subcontractors)
- Inland Empire Paper (in-kind)
- Wikoff Color Corporation
 - In-kind contribution of time
 - Materials in budget
- Northwest Offset Printing (Local WA publisher and sister company to Inland Empire Paper; will provide additional samples for testing)
- Testing Lab (Eurofins)
- ChemFORWARD (project lead)

Scope of Work

1. Project Management

Project management will be performed by Lauren Heine for ChemFORWARD. Project management includes setting up weekly calls with Mark Vincent and Grace Manarang-Pena (Chroma team) and others from the broader project team as needed. It includes coordinating and/or tracking sample testing, ink reformulations, and performance testing results. The Chroma team will help establish performance requirements, identify alternative pigments, review new formulations, and help to evaluate performance results

2. Test currently used ink formulations for the presence of iPCBs

Lewiston Morning Tribune (Lewiston) currently uses four base colors (yellow, red, blue and black) to print newsprint and paper packaging. A sample of each color will be tested using EPA method 1668. Samples will be run in at least duplicate to capture variability. A second printing company, Northwest Offset Printing will join the pilot, and provide samples of their inks for PCB testing. Northwest Offset Printing will also test samples of four base colors (in duplicate). *(Note: Northwest Offset Printing is participating ONLY in the testing of PCBs in their inks and not in the ink reformulation part of this project.)* A total of 33 samples are expected to be tested during this project. The PCB testing budget is set at a “not to exceed” limit.

3. Identify performance requirements and acceptable cost criteria (Lewiston, Wikoff and Chroma)

The ChemFORWARD research team will work with Lewiston and Wikoff Color Corporation to specify the performance requirements and to set a target cost for viable alternative ink formulations. A sample (kit) of the yellow ink used by Lewiston will be sent to Wikoff Color Corporation to help them establish a benchmark for performance and cost for yellow ink.

4. Identify alternative pigments that should not contain iPCBs

The ChemFORWARD research team (Chroma) will use the ChemFORWARD Pigment Resource and will recommend one or more alternative pigments that can be used to substitute for the pigments currently used in Lewiston yellow ink formulations.

5. Formulate new ink formulations that use the recommended alternative pigments and that meet performance and cost targets

The team at Wikoff Color Corporation will create one or more formulations to meet the performance and cost targets using the alternative pigment(s). Formulations that appear to meet

the cost and performance requirements will be developed at larger scale to allow for testing the newly formulated ink in the Lewiston printing process.

6. Test the new ink formulations for iPCBs (Eurofins)

EPA Method 1668 will be used to test the new formulation(s) for PCBs. Multiple tests (at least duplicate) of each new formulation will be submitted for testing to capture variability.

7. Compare the initial and revised formulations for cost, performance and PCB content

Based on the results of the performance trial, the cost estimates from Wikoff, and PCB test results a document will be prepared comparing these parameters for the current and proposed revised ink formulation.

8. Report results and proposed next steps for future work

The results of this pilot project will be summarized in a report and next steps will be recommended. Depending on the results, another pilot project focusing on alternative ink formulations for colors other than yellow may be proposed.

Timeline

Phase 1 of this project will begin upon approval of this proposal and will be completed by 30 June 2023. Additional work may be proposed pending results but funding of the additional work is outside of the scope of this proposal.

Budget

ChemFORWARD/HBN requires 50% payment at the start of the project to cover costs for testing and raw materials, and the remainder upon completion of tasks. The cost of this project includes the following:

1. Project management
2. PCB testing: Testing ink samples for PCBs using EPA Method 1668. The cost estimate is NOT TO EXCEED and includes shipping and/or other transportation costs. Testing will be done on at least two samples of each ink formulation. Testing will be performed on:
 - a. Current ink formulations for 4 colors used by Lewiston (at least duplicate)
 - b. Four samples from inks currently used by Northwest Offset Printing (in duplicate)
 - c. Candidate yellow formulations designed by Wikoff (number tbd).
3. Research
 - a. Evaluation and specification of performance requirements and cost targets including collection of documentation from Lewiston
 - b. Research and recommendations for alternative pigments (low or no-PCB containing)

- c. Help with evaluating PCB and performance test results
- d. Work with Wikoff to characterize the pigment(s) to optimize formulations
- 4. Development
 - a. Procurement of pigments to meet yellow ink performance requirements using no/ultra-low PCB candidates
 - b. Formulation of yellow inks with the alternative pigment(s) to meet performance and cost targets. Raw material costs included in the budget.
 - c. Testing of alternative ink performance in Lewiston presses including troubleshooting and formulation modifications to optimize performance.
- 5. Reporting
 - a. Periodic updates to the Task Force (virtual presentations)
 - b. PCB test results for all samples
 - c. Final report that compares the current and proposed revised ink formulations for:
 - i. Presence of iPCBs
 - ii. Cost
 - iii. Performance
 - d. Recommended next steps for the other ink colors (other than yellow).

Table 1. Detailed Budget

Task	Team Lead	Rate	Hours or Qty	Labor (CF)	Raw Material and Testing Costs (Not to exceed)	In-kind Contribution	Total (\$)
Project Management	ChemFORWARD/Heine						
Lauren Heine		\$ 200	72	\$ 14,400			\$ 14,400.00
PCB Testing	Eurofins Testing Lab	\$ 950	33	\$ -	\$ 31,350.00		\$ 31,350.00
Research & Development	ChemFORWARD/Vincent						
Mark Vincent		\$ 200	60	\$ 12,000			\$ 12,000
Lauren Heine		\$ 200	20	\$ 4,000			\$ 4,000
Formulation R&D and printing labor (in-kind)	Wikoff, Chroma SC and Lewiston	\$ 200	170			\$ 34,000.00	\$ -
Raw Materials (pigments, inks, and pilot material runs)					\$ 50,000.00		\$ 50,000.00
Reporting							
Lauren Heine		\$ 200	10	\$ 2,000			\$ 2,000.00
Mark Vincent		\$ 200	6	\$ 1,200			\$ 1,200.00
Subtotal						\$ 34,000.00	\$ 114,950.00
HBN Administrative Fee		10%					\$ 11,495.00
Total cost of proposed work to SRRTF							\$ 126,445.00
Total value with in-kind contribution							\$ 160,445.00

About the Team

ChemFORWARD is a non-profit, value chain collaboration committed to providing trusted data on chemicals for use in consumer products. ChemFORWARD is a fiscally-sponsored project of the non-profit, Healthy Building Network (HBN). We believe that credible and robust hazard information and other relevant data on safety and sustainability underpins the pathway to safer products, and that increased use of such information will support proactive decision making and

lead to safer products for all. This information is essential to enable a safe and circular economy. Our vision is to create the globally trusted source of cost-effective chemical hazard data for safer alternatives within a framework of safe and sustainable design. Lauren Heine will lead the project management for ChemFORWARD.

PROJECT TEAM

Lewiston Printing/Revolve Print and Pack

Revolve Print and Pack is a family and employee-owned company born from a commitment to preserve, protect and champion our natural environment. An offshoot of a fourth-generation newspaper, Revolve's founders made the decision to not just report on issues of environmental significance, but to provide solutions that make a tangible difference. And like all successful ventures – it starts and ends with good, and passionate, people.

Northwest Offset Printing

Northwest Offset Printing is a local Washington company and a sister company to Inland Empire Paper. Northwest Offset Printing will contribute ink samples for testing for PCBs.

Wikoff Color Corporation:

Wikoff Color Corporation is a leading ink and coatings manufacturer for commercial printing applications. Wikoff is committed to producing high quality, tailor-made inks for the most challenging avenues of the printing.

Testing lab (Eurofins):

A testing lab in North America (Eurofins) will be commissioned to do the PCB testing. Individual tests are expected to be ~\$950 each.

Mark Vincent, Ph.D., President of Chroma Specialty Chemicals

Dr. Mark Vincent will serve as research lead. Dr. Vincent is a highly experienced technical expert in color including dyes and pigments. He is a successful executive with a long track record of achieving corporate growth objectives through strategic plan development and implementation, providing diverse perspectives and positive leadership. Dr. Vincent has proven ability across multiple business functions including Operations, Sales, Marketing, R&D, Regulatory and Finance. He formerly served as the Group CEO and Technical Vice President of Dominion Colour Corporation in Toronto, Canada. Dr. Vincent earned his Ph.D. in Organic Color Chemistry at Cardiff University in Wales. His academic expertise and industry expertise will ensure research integrity and information produced that is practical and relevant to users. Contact: markvincent@chromasc.com; +1 (416) 702-9984; Toronto Canada; <https://chromaspecialtychemicals.com/contact-us/>

Grace Manarang-Pena, Vice President - Regulatory and Marketing

Since joining the pigment industry 25 years ago, Grace has become an expert in the global regulatory compliance of pigments as well as the development of specialty colored pigments. She spent over half her career in R&D before transitioning to the Global Regulatory, ISO and EHS Manager and Certified Toxic Reduction Planner at Dominion Colour Corporation in Toronto. Grace has been involved with Chemical Management Plan (CMP) activities in Canada, particularly with Azo substance grouping. With various associations in North America and Europe, she has participated in several Government interfaces and conferences, namely Chemcon. In 2014, Grace presented the process and lessons learned from the EU REACH Authorization Process, being the first to successfully apply for Authorization within the REACH remit. Grace continues to monitor the global regulatory landscape for pigments and dyes. She works closely with manufacturers, customers, and associations to communicate the implications of chemical management programs (such as REACH) and GHS compliance.

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ChemFORWARD/HBN

Lauren Heine, Ph.D., ChemFORWARD

Dr. Heine will serve as primary project manager and principal investigator for ChemFORWARD. She applies green chemistry, green engineering, alternatives assessment and multi-stakeholder collaboration to develop tools that result in safer and more sustainable chemical products and processes. Her work with ChemFORWARD builds on prior experience developing *GreenScreen® for Safer Chemicals*, a pioneering method for chemical hazard assessment to enable informed substitution; and *CleanGredients™*, a web-based information platform for identifying greener chemicals for use in cleaning products; both tools were designed to scale access to information needed to develop materials and products that are safe and circular. Lauren worked closely with the US EPA Safer Choice Program to facilitate development of ingredient and hazard criteria for the Safer Choice Program.

For the SRRTTF, Dr. Heine worked in her capacity at Northwest Green Chemistry to provide several reports outlining potential green chemistry -- “beginning of product life” -- options to address the inadvertent PCB issue. For the OECD, Lauren drafted *Policy Principles for Sustainable Materials Management* and *Considerations and Criteria for Sustainable Plastics from a Chemicals Perspective*. She served on the California Green Ribbon Science Panel and co-chairs the Apple Green Chemistry Advisory Board. Lauren advised the technical development of the Interstate Chemicals Clearinghouse Alternatives Assessment Guide. She began her career as a Fellow with the American Association for the Advancement of Science in the Green Chemistry Program at the US Environmental Protection Agency. Lauren earned her doctorate in Civil and Environmental Engineering from Duke University.

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