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Addendum #1 to Quality Assurance Project Plan

PCBs in General Consumer Products

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Addendum

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This addendum is an addition to an original Quality Assurance Project Plan. It is not a correction (errata) to the original plan.

Original Publication

Quality Assurance Project Plan for PCBs in General Consumer Products

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Quality Assurance Project Plan Addendum

Addendum to Polychlorinated Biphenyls (PCBs) in General Consumer Products

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DEPARTMENT OF ECOLOGY

Hazardous Waste and Toxics Reduction

Overview

In 2013, the Washington State Department of Ecology (Ecology) initiated a study to evaluate presence of PCBs in general consumer products. Particular emphasis was placed on products known to contain PCBs as a contaminant formed during the manufacturing of dyes and pigments contained within the product. Example products known to contain PCBs as contaminants include paints (Hu, 2010) and newspapers, glossy magazines, cereal boxes, yellow plastic bags. (Rodenburg, 2012).

In the previous study, 68 products were tested for PCBs. Several products were separated into more than one sample and 74 samples were submitted for analysis. PCB-11 was found above the reporting limit in 66% of the samples tested. An additional 2% of the samples tested reported PCB-11 results as estimates near the reporting limit and are likely to contain PCB-11.

PCB-206 and -208 were not present in most of the products tested. One sample contained both PCB-206 and -208 while 7 contained PCB-209. One product, a phthalocyanine green based colorant used to color white paint, contained detectable levels of all four PCBs listed above. It was the only sample to contain PCB-206 and -208 at detectable levels.

The samples were separated into product categories including packaging, paper products, paints and paint colorant, caulks and a miscellaneous category consisting of two printer inks and two food samples. PCB-11 was found in all product categories in the range of 1 to 45 ppb. These results confirm the presence of PCB contamination in consumer products.

Almost all paint and colorant samples tested contained one or more PCBs at detectable levels. Packaging and paper products sampled contained PCBs, particularly PCB-11. Caulks currently on sale do not appear to be a significant PCB source although PCB-11 was found in one caulk that changed from pink to white during curing. Given the small sample size, further evaluation of caulks is warranted.

In 2013, the Washington State Legislature (WSL) passed a law directing the Washington Department of Enterprise Services (DES) to purchase products uncontaminated with PCBs. The law also granted DES the authority to require manufacturers to submit sampling results proving their products are not PCB contaminated (WSL, 2014). In addition, the Spokane River Stewardship Partners, an association of industry, governments and environmental groups tasked with protecting the quality of the Spokane River, sent Ecology a letter recommending products for future analysis (SRSP, 2014). Lastly, other product categories were recommended for future

analysis, some of which are included in this addendum. This addendum expands upon the type of products sampled in the original study to include products from these additional sources.

Products to be sampled in this study include but are not limited to:

- Yellow clothing.
- Dyes used in silk screening and cloth dyeing.
- DES food packaging, office supplies, road paint and clothing.
- Toothpaste, face and sun creams, lipstick and bar soap.
- Comic books.

PCB product analysis requirements are described in the original Quality Assurance Project Plan.

Experimental Design

Target chemicals proposed for testing and recommended practical quantitation limits (PQLs) for each are listed in Table 1.

Table 1. Analytes of Interest

Analyte	CAS Number	PQL+ (ppb++)
PCBs	1336-36-3	1.0

+ The PQL are based upon the sediment PQLs reported in Method 1668 (EPA, 1999).

++ ppb = parts per billion of PCB congener by weight.

Although the concentration of all 209 congeners is required, four congeners must be included in all standards and QC spikes. These four congeners (Table 2) include:

Table 2. Congeners to be included in all standards

PCB	CAS	PQL+ (ppb++)
3,3'-Dichlorobiphenyl ; PCB-11	2050-67-1	1.0
2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl; PCB-206	40186-72-9	1.0
2,2',3,3',4,5,5',6,6'-Nonachlorobiphenyl; PCB-208	52663-77-1	1.0
Decachlorodiphenylether; PCB-209	2051-24-3	1.0

+ The PQL are based upon the sediment PQLs reported in Method 1668 (EPA, 2003).

++ ppb = parts per billion of PCB congener by weight.

An additional 77 samples from the proposed product list will be selected for PCB analysis.

Analytical Laboratory

Samples will be sent to a contract laboratory for extraction and analysis using an EPA approved method. The method, along with the estimated reporting limit (RL), is listed in Table 3.

Table 3. Laboratory Methods and Reporting Limits

Analyte	Digestion Method	Instrumentation	Method	RL++ (ppb)+++
All 209 PCB congeners	1668B	HR GC/MS+	EPA 1668A	1.0 (ppb)++++

+GC/MS = Gas chromatography/mass spectroscopy ++RL = Reporting Limit
+++ppb = parts per billion of analyte in sample by weight

Quality Objectives

Quality objectives for this project are to obtain data of sufficient quality to determine the amount of PCB congeners in a representative subsample of general consumer products. Details are listed in the original QAPP (Ecology, 2013) were determined to be too restrictive and new goals established (Table 4).

Table 4. MQOs for Laboratory Analyses

Analyte	Laboratory Control Samples (recovery)	Matrix Spikes+ (recovery)	Duplicates+ (RPD) ++	Method Blanks (ppb)+++	Surrogate Recovery
209 PCB congeners	15 - 150%	60-140%	± 50%	< 1.0	15-150%

+ Matrix spike and split duplicates ++RPD = Relative Percent Difference +++ppb = parts per billion

Quality Control Procedures

Table 5 displays the laboratory QC tests planned for the analysis. Laboratory QC tests will consist of laboratory control samples, matrix spikes, matrix spike duplicates, laboratory duplicates, and method blanks. Final congener results will be corrected for surrogate recovery.

ALS will conduct a data quality assessment and provide the project manager with case narratives describing holding times, instrument calibrations, and results of quality control tests.

Table 5. Quality Control Tests

Analyte	LCS	Matrix spike	Matrix spike Duplicates	Laboratory Duplicates	Method Blanks	Surrogates
PCB congeners	1/batch	1/batch	1/batch	1/batch	1/batch	Every sample

LCS: laboratory control sample Batch: 20 or fewer samples

Data Management Procedures

All method detection limits (MDLs) will be calculated using the U.S. EPA MDL procedure found in Title 40 Code of Federal Regulations Part 136 (CFR Part 136, Appendix B, revision 1.11). All remaining data management procedures will follow those stated in the original QA Project Plan (Ecology, 2013).

References

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