

PFAS in Food Packaging Alternatives Assessment

Attachment A

Statement of Work

Overview

In 2018, Washington State passed a new law to prohibit all per- and polyfluorinated substances (PFAS) in plant fiber-based food packaging. The ban takes effect following the identification of safer alternatives (not limited to paper) as specified in the toxics in packaging law ([RCW 70.95G](#)).

The assessment of alternative products must follow the Interstate Chemicals Clearinghouse (IC2) Alternatives Assessment Guide (v 1.1) and consider chemical hazard, exposure, performance, cost, and availability [RCW 70.95G.070].

Ecology is requesting bids from contractors to support the alternatives assessment (AA) determination. The contractor will develop data on PFAS-based and PFAS-free food packaging products and chemical treatments to address the specific criteria described in the law. The contract work should be completed by no later than August 31, 2019.

Ecology will make the final decision as to whether safer alternatives to PFAS food packaging are available. Ecology is required to submit these findings to an external peer review. Ecology is also required to publish the findings and feedback from the peer review in the Washington State Register. The ban on PFAS-based packaging will take effect two years after a safer alternative is identified.

Contract Work

What Products Are Covered by the Law?

Food packaging means “a package or packaging component that is intended for direct food contact and is comprised, in substantial part, of paper, paperboard, or other materials originally derived from plant fibers.” Ecology will conduct an alternatives assessment based on the functional requirements of the food packaging (e.g., grease and oil resistance). The alternatives that serve these functions and the appropriate products or product categories will be selected by Ecology following data gathering and input from the contractor.

Safer Alternative Determination

Ecology’s safer alternative determination must address the following criteria:

- The alternatives must meet improved hazard and exposure considerations relative to PFAS-containing products [RCW 70.95G.010 (6)].
- The alternatives must be practicably and economically substituted for PFAS-containing products [RCW 70.95G.010 (6)].
- The alternatives must be readily available in sufficient quantity and at a comparable cost [RCW 70.95G.070 (3)].
- The alternatives must perform as well as or better than PFAS chemicals in a specific food packaging application [RCW 70.95G.070 (3)].

The contractor, under the direction of Ecology, will develop the data needed to address these assessment criteria. The contractor will conduct research and convene meetings or otherwise survey interested parties and experts to gather data on performance, cost, and other criteria.

Specific Assessment Needs

This proposal follows the steps and assessment modules in the order described in the IC2 Guide.

Chemicals of Concern

RCW 70.95G.010 (4) identifies the chemicals of concern as “Perfluoroalkyl and polyfluoroalkyl substances” or “PFAS Chemicals.” These are further defined as “a class of fluorinated organic chemicals containing at least one fully fluorinated carbon atom.”

Since an exhaustive assessment of all PFAS additives and associated adjuvants is neither practicable nor required, the AA will use a single, base case PFAS formulation as the chemicals of concern. Ecology must approve the formulation selection and which ingredients are carried forward to further assessment.

Decision Rules

Ecology will propose decision rules for comparisons between PFAS-based and PFAS-free alternative products. The Contractor will interview experts and knowledgeable parties, and engage interested parties (see Interested Parties Outreach and Engagement below) to develop data on cost comparability, performance measures, and other assessment criteria (Table 1). The contractor will provide input and feedback on Ecology’s proposed decision rules.

Table 1. Development of Decision Rules (the AA module sections of this document contain additional detail)

Criterion	Decision Rule Assumptions	
	Contractor Role	Ecology Role
RCW 70.95G.010 (6) defines “safer alternative” as a substance or chemical that:		
<ul style="list-style-type: none"> meets improved hazard and exposure considerations 	Evaluate PFAS-free and PFAS-based food contact substances via GreenScreen or equivalent assessments. Identify “improved” hazard and exposure considerations using GreenScreen assessments. For chemicals with the same GreenScreen assessment score, contractor will develop a recommendation for a narrative evaluation to identify “improved” hazard and exposure based on individual endpoint determinations.	Specify any narrative evaluation criteria. Determine if the alternative has an improved hazard and exposure profile.
<ul style="list-style-type: none"> can be practicably and economically substituted 	Contact users and manufacturers of alternative products to determine whether they are being used; assess data on any issues or difficulties in substituting alternatives to PFAS containing products.	Determine if the alternatives can be practicably and economically substituted.

Criterion	Decision Rule Assumptions	
	Contractor Role	Ecology Role
RCW 70.95G.070 (3) specifies additional requirements that a safer alternative must:		
<ul style="list-style-type: none"> be readily available in sufficient quantity and at comparable cost 	Contact purchasers, users and manufacturers of alternative products to determine whether they are being used and assess data on relative costs.	Determine if alternative meets the requirement.
<ul style="list-style-type: none"> perform as well as or better than PFAS chemicals in a specific application 	The contractor will identify relevant performance criteria and data to document the performance of alternatives and PFAS-based products in specific applications.	Determine if alternative meets the requirement.
<ul style="list-style-type: none"> if the alternative is a chemical 	Contractor will verify that the food contact substances in any proposed packaging alternative are used in a manner that complies with FDA regulations.	None

Framework

Ecology's preferred approach is to use the sequential framework based on experience with the IC2 Guide.

Interested Parties Outreach and Engagement

Ecology will lead efforts to coordinate outreach and engagement related to the alternatives assessment. Ecology's communications plan is to: 1) provide regular public updates to the PFAS CAP Advisory Committee and listserve, 2) implement the Peer Review process; and 3) provide subject matter expert (SME) forums to seek input, as needed.

The contractor and Ecology will engage with interested parties to gather information from the food packaging industry, food service business professionals and other interested parties to:

- **Identify Alternatives to Evaluate.** The contractor will identify alternatives (chemical and non-chemical) so that interested parties can provide feedback to Ecology.
- **Performance and Substitution.** The contractor will engage interested parties to identify whether alternative products/solutions can be practicably substituted. Interested parties can also provide information on performance through standard industry test methods, product-specific performance tests, and qualitative assessments.
- **Availability and Cost.** Contractor will develop data on availability and cost.

Confidential Business Information (CBI)

The data required for the alternatives assessment may not be publicly available. The contractor will negotiate with manufacturers and suppliers to obtain the information and data needed to support the safer alternative determination.

Ecology has statutory authority to protect confidential business information (CBI). Businesses have the option to submit information to the agency under RCW 43.21A.060. Ecology staff will provide technical

assistance and process the requests so that manufacturer and supplier information are kept confidential as required by agency policy.

The contractor will obtain manufacturer’s CBI from Ecology under non-disclosure agreement (NDA). The protections, responsibilities, and assurances necessary for handling CBI will be detailed under a separate amendment to be added later.

Table 2 Examples of food packaging where PFASs may be used. This list is not exhaustive and should not be interpreted as limiting the range of products considered for the alternatives assessment work.

MARKET SEGMENT	PACKAGE TYPE	BASE MATERIAL
Quick Service Restaurants (QSR): such as national brands or local chains	Wraps/Liners	Paper
	Pinch Bottom Bags	Paper
	Flat Bottom Bags	Paper
	Clam Shells	Corrugated
		Board
	Cartons	Molded Fiber
		Board
	Bowls/Soup Containers	Molded Fiber
	Pizza Boxes	Board
	Food Service (FS): such as private restaurants, hospitals, institutions, or groceries	Trays
Trays		Board
		Molded Fiber
Cartons		Corrugated
		Board
Take Out Packages		Board
		Molded Fiber
Pizza Boxes		Corrugated
		Board
Boxes		Corrugated
Bowls/Soup Containers	Board	
Bakery Packaging (bags/liners)	Paper	
Deli Packaging (wraps/liners/interleaves)	Paper	
Bread Bags	Paper	
Prepared/Ready-to-eat Food Containers	Board	
Consumer Packaged Goods (CPG): such as items sold in retail stores	Confectionary/Candy Wrap	Paper
	Snack Bags	Paper
	Microwave Popcorn Bags	Paper
	Pet food bags	Paper

PFAS Food Packaging and Identifying Alternatives

Given the project constraints, Ecology recommends narrowing the package type for the alternatives assessment. Examples of possible products and application areas are identified in Table 2.

Published research suggests that PFAS-containing and PFAS-free food packaging products serve some of the same or identical markets (Andrews & Walker, 2017; Schaider, et al., 2017). Several recent investigations have also identified a variety of PFAS-free food packaging for many applications, as well as alternative coatings and treatment approaches (Center for Environmental Health, 2018; Clean Production Action, 2018).

The contractor will conduct research to identify PFAS-free products that are currently available on the U.S. market.¹

Functional substitution or non-chemical alternatives (e.g., mechanical densification approaches) should be considered for relevant applications (Trier, Taxvig, Rosenmai, & Pedersen, 2018). Chemical or coating treatments may involve treatments introduced at the wet-end of the papermaking process or surface treatments, such as size press applications or off-machine coaters.

Suitable alternatives may not contain PFASs that have been intentionally added in any amount. Given their widespread use in manufacturing operations, food packaging components may be contaminated with PFASs during manufacturing or downstream converting processes. There is no budget for confirmatory testing in this project.

Since food packaging does not generally identify food contact substances, the contractor should ensure that the manufacturer/supplier of a proposed alternative will disclose the food contact substances and formulation adjuvants, so that hazard and exposure assessments can be completed. Ecology will provide manufacturers and suppliers the opportunity to obtain confidential treatment under [RCW 43.21A.160](#). The manufacturer/supplier should provide information on food types and conditions of use that would be consistent with FDA requirements for the application.²

Ecology is requesting the contractor to efficiently address the largest possible range of products (specific applications) in the PFAS food packaging market within the budget and duration of the contract. The contractor will identify potential alternatives for assessment and Ecology will make the final selection of products and application areas assessed.

Interested Parties Outreach and Engagement on Alternatives and Applications

The contractor will hold at least two webinars to share information on the proposed food packaging applications, products and data gathering. Interested parties may provide input on:

- Whether the proposed alternatives can be practicably substituted [RCW 70.95G.010(6)].

¹ RCW 70.95G.070 (3) specifies that a safer alternative must "...be readily available in sufficient quantity..." Given the two-year transition period that would occur prior to any potential product ban, the contractor may consider packaging products that are available in foreign markets but could be successfully introduced to the U.S. market.

² The FDA provides guidance on determining the regulatory status of food contact substances:

<https://www.fda.gov/food/ingredientspackaginglabeling/packagingfcs/regulatorystatusfoodcontactmaterial/default.htm>.

- Whether the proposed alternatives are or could be readily available in sufficient quantity by 2022 [RCW 70.95G.070(3)].
- Performance, cost, and availability of proposed alternatives.
- Other alternatives that should be considered for evaluation and valid groupings of products.
- Prioritization of specific products for assessment.

Hazard Module

The contractor will work with Ecology to perform or obtain Level 2 assessment³ of hazards of formulation components. This may include GreenScreen® for Safer Chemicals or equivalent assessments. The contractor will not be expected to spend more than \$25,000 for hazard assessment work. Ecology may elect to separately contract for GreenScreens as part of the hazard and exposure assessment. Ecology will publish completed hazard assessments in the IC2 Chemical Hazard Assessment Database (as appropriate) and on the Ecology website. Hazard assessments may be redacted with approval of Ecology but must permit endpoint hazard score (vH, H, M, L, vL) comparisons of formulation components.

The contractor may perform an initial hazard screen using the GreenScreen List Translator or other hazard screening method approved by Ecology before selecting chemicals for the minimum Level 2 assessment. Formulation chemical disclosure should meet the best practices identified in the GreenScreen for Safer Chemicals Hazard Assessment Guidance, version 1.3. Ecology will approve the final list of chemicals for assessment.

Performance Assessment Module

The contractor will develop data to assess at least one alternative for each application using Level 1 performance guidance. RCW 70.95G.070 (3) states that safer alternatives must “. . . perform as well as or better than PFAS chemicals . . .” but does not further define performance. The contractor will consult with interested parties to identify appropriate performance criteria for each specific application. These may include qualitative or quantitative measures of performance.

Given the widespread use of PFAS-free food packaging, actual performance data from specific alternative products should be available (Andrews & Walker, 2017; Schaidler, et al., 2017). Interested parties can also help identify whether alternative products and solutions can be “practically substituted” [RCW 70.95G.010 (6)].

The contractor will provide input to Ecology’s proposed decision rules (in preparation) to determine whether PFAS-free alternatives perform as well or better than PFAS chemicals. There may be cases where PFAS-based products perform beyond levels required for an application. Alternatives do not need to achieve levels beyond application requirements in order to meet the law’s criteria for safer alternatives.

Cost and Availability Module

The contractor will perform a Level 1 assessment of cost and availability. RCW 70.95G.010 (6) defines “safer alternative” as a substance or chemical that “. . . can be . . .economically substituted . . .” RCW

³ The IC2 Guide identifies levels of effort for each of the assessment modules. The contractor can perform work beyond the requirements of the assigned level, as needed.

70.95G.070 (3) specifies that a safer alternative must “. . . be readily available in sufficient quantity and at a comparable cost.” The IC2 Guide Cost and Availability Module uses similar cost comparison language.

Given the apparent widespread use of PFAS-free food packaging, food service businesses are clearly willing to purchase PFAS-free products in the same markets where PFAS-containing products are used (Andrews & Walker, 2017; Schaider, et al., 2017). The contractor will engage interested parties and experts to develop data on the costs of PFAS-free alternative products relative to PFAS-based products in specific applications.

The contractor will review and provide input to Ecology’s proposed decision rules on cost and availability. Cost and availability should be addressed in an order (and in time) to benefit the prioritization of chemicals for hazard assessment. Ecology must approve the decision rules regarding cost and availability.

Exposure Assessment Module

The contractor will perform a Level 1 assessment of exposure. This includes a narrative explanation of primary exposure from food contact packaging to food, other use-phase exposures, and end-of-life exposures.

Major jurisdictions in Washington State, such as Seattle/King County, may send food packaging waste from households and businesses to composting facilities. Packaging chemicals or degradates can re-enter the food cycle when this compost is applied in commercial agriculture or home gardens (Bräunig, Baduel, Barnes, & Mueller, 2019; Bizkarguenaga, Zabaleta, Prieto, Fernández, & Zuloaga, 2016). Stormwater runoff associated with compost applications lead to further environmental exposures. Ecology will jointly assess hazard and exposure primarily through GreenScreen assessment scores, but physicochemical data on formulation constituents may be needed to further justify the safer alternative determination. These data are required for the Level 1 exposure assessment.

Safer Alternative Determination

Ecology will make a determination of whether the food packaging products assessed in this contract meet the law’s definition of safer alternatives. Tables 1 (above) and 3 (below) identify key decision authorities for the AA process. Ecology will report safer alternative determinations for external peer review. Ecology’s findings and feedback from the peer review will be reported to the legislature and published in the Washington State Register.

Key Decision Authority

Table 3. Key decisions and the roles for contractor and Ecology.

DECISION POINT	CONTRACTOR ROLE	ECOLOGY ROLE
DECISION RULES		
<ul style="list-style-type: none"> • DETAILS DESCRIBED IN TABLE 1. 	Decision rules are developed.	Approve decision rules.
SELECTION OF CHEMICALS OF CONCERN (PFAS)	Contractor provides input on base case formulation.	Ecology selects the base case PFAS formulation.
SELECTION OF ALTERNATIVE TREATMENT (NON-PFAS) CHEMICALS, AS APPLICABLE	Contractor identifies candidate food contact substance formulations and recommends ingredients for hazard and exposure evaluation.	Ecology selects the alternative chemical formulation(s) prioritized for evaluation. Ecology approves the specific list of substances for hazard and exposure evaluations. Substances may include and are not necessarily limited to ingredients, manufacturing intermediates, transformation products, and impurities.
SELECTION OF PRODUCTS FOR APPLICATION GROUPS	Contractor provides recommendations on products or product groups.	Ecology selects product or product groups.
SELECTION OF REPRESENTATIVE PRODUCTS FOR EVALUATION AS ALTERNATIVES	Contractor recommends products to represent each application group.	Ecology selects products for evaluation.
PEER REVIEW	No role.	Ecology selects peer review group and submits findings for their review.
FINAL REPORT ALTERNATIVE RECOMMENDATIONS	No role.	Ecology prepares final report to legislature and publishes in the Washington State Register.

References

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