September 2017 DRAFT Per- and Poly-Fluorinated Alkyl Substances Chemical Action Plan (PFAS CAP)

The Washington State departments of Ecology and Health prepared a draft of several PFAS CAP chapters for external review. This document is one chapter to a planned multi-chapter PFAS CAP. This material may be modified in response to comments and the content re-organized for the final Action Plan.

The September 2017 Draft PFAS CAP includes:

- Health, Environment, Chemistry, Regulations – posted online by 09/20/2017
- Uses, Intro – posted online by 10/05/2017

The draft chapters may include cross-references to other sections/chapters in the Draft PFAS CAP or notes where additional information will be provided in a later draft.

The PFAS CAP Advisory Committee will discuss comments on these draft chapters at the November 1, 2017 meeting.

Ecology and Health are asking interested parties to provide feedback. Comments on these draft documents are due to Ecology by **October 20, 2017.**

Comments on all chapters will be accepted after October 20th. Comments received by October 20 will be reviewed at the November 1 Advisory Committee meeting.

Submit comments, suggestions, and questions to Kara Steward at kara.steward@ecy.wa.gov

The Draft PFAS CAP documents are posted at https://www.ezview.wa.gov/?alias=1962&pageid=37105 (at the bottom of the webpage).

Introduction

Persistent, bioaccumulative and toxic (PBT) chemicals pose a unique threat to human health and the environment in Washington State. PBTs remain in the environment for long periods of time, are hazardous to the health of humans and wildlife, can build up in the food chain, and can be transported long distances and readily move between air, land and water media. Because of the unique threat that these PBTs pose, special attention is necessary to identify actions that will reduce and eliminate their threats to human health and the environment.

Ecology addresses PBTs through existing regulatory and nonregulatory programs. A chemical action plan (CAP) provides a multimedia, cross-program approach to reduce and phase-out releases and uses of PBTs over time. Washington's PBT rule (Chapter 173-333 Washington Administrative Code (WAC)) establishes the process used to develop CAPs and identifies the list of PBT chemicals.

The PBT rule requires that CAP development involve an external advisory committee to provide input and expertise. Throughout CAP development advisory committee members and other interested parties are asked to review draft CAP chapters and participate in advisory committee meetings. The Draft CAP will be distributed for public review and comment. The advisory committee for the per- and poly-fluorinated alkyl substances (PFAS) CAP includes representation from:

- Advocacy groups: Clean Production Action, Green Science Policy Institute, Institute of Neurotoxicology and Neurological Disorders, Toxic-Free Future, and Zerowaste Washington.
- Business: Association of Washington Business, Carpet and Rug Institute, FluoroCouncil, and Outdoor Industry Association.
- Governments: Agency for Toxic Substances and Disease Registry, City of Issaquah, Island County Public Health, King County Department of Natural Resources, Office of Governor Jay Inslee, Port Gamble S'Klallam Tribe and Port of Seattle.
- Interested parties: Naval Facilities Engineering Command Northwest, Port of Seattle Firefighters, University of Washington-Tacoma, Washington Fire Chiefs Association, Whidbey Island Water Systems Association, and Whitman College.

This PFAS CAP describes the physical and chemical properties of various PFAS and why specific PFAS may be~~they are~~ considered toxic to humans and other organisms. The PFAS CAP will identify, characterize and evaluate uses and releases of specific PFAS (mostly PFAS belonging to the class of PFAA – perfluoroalkyl acids) and recommend actions the state may take to reduce threats posed by PFAS that fulfill the PBT criteria. Recommendations will include nominating substances as PBT chemicals (according to Washington's PBT rule, WAC 173-333-320), a set of actions to reduce and phase out uses, releases, and exposures in Washington in consideration of current management approaches. An economic analysis of recommendations and the most promising options will be included.

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PBTs and Per- and Poly-fluorinated Alkyl Substances

The PBT rule identifies 18 chemicals, 8 chemical groups and two metals that meet the criteria (Table 1) used to include chemicals on the PBT list.

Table 1 – PBT criteria in the rule (WAC 173-333-320)

Criteria used for the PBT list in rule
Persistence - half-life of the chemical in water, soil or sediment is greater than or equal to sixty days.
Bioaccumulation - bioconcentration factor or bioaccumulation factor in aquatic species is greater than 1,000 or log-octanol water partition coefficient (log Kow) greater than 5.
Toxicity - potential to be toxic to humans or plants and wildlife; carcinogen, developmental or reproductive toxicant or a neurotoxicant; reference dose or equivalent toxicity measure that is less than 0.003 mg/kg/day; chronic no observed effect concentration (NOEC) or equivalent toxicity measure is less than 0.1 mg/L; acute no observed effect concentration (NOEC) or equivalent toxicity measure is less than 1.0 mg/L.
Metals likely to be present in forms that are bioavailable.

PFAS compounds in the PBT list are perfluorooctane sulfonic acid[1] (PFOS) and related salts (Table 2). The compounds belong to the class of long-chain PFSA (perfluoroalkane sulfonic acids)."

Table 2 – PBT chemicals in the rule (WAC 173-333)

Chemical	Chemical Abstract Service (CAS) number
Perfluorooctane sulfonic acid (PFOS)	1763-23-1
PFOS ammonium salt	29081-56-9
PFOS diethanolamine salt	70225-14-8
PFOS lithium salt	29457-72-5
PFOS potassium salt	2795-39-3

PFAS are commercial surfactants and polymers used in a wide variety of industrial, commercial and consumer applications. PFAS have been reported to include thousands of fluorinated chemicals. PFAS have been used to provide non-stick surfaces on cookware and waterproof coatings for textiles and paper products. They serve as high performance surfactants in numerous products that must flow freely, including paints, cleaning products, fire-fighting foams used to fight fuel-based fires, and engineering coatings used in semiconductor production. Many PFAS degrade to highly persistent and bioaccumulative chemicals such as perfluorooctanoic acid (PFOA) and PFOS.

[1] The PFAS CAP uses the widely adopted terminology for PFAS described in Buck et al., 2011. PFOS in the WAC is defined as "perfluorooctane sulfonic acid."

Commented [A3]: This information does not appear to be specific to PFAS, so suggest moving up to the intro or changing the section title.

Commented [A2]: It is unclear what kind of substances are being addressed. Are those chemicals identified by Washington State already and those are on the current State's PBT list?

Commented [A4]: The issue here is how many PFAS chemicals are actually in commerce and at what production levels. The 3000 number is likely overstated for actively manufactured finished products in current commercial use.

Commented [A5]: By some estimates, over 3,000 substances could be classified as PFAS based on their chemical structures, but only a fraction of those PFASs have any commercial use today. These PFAS provide unique properties enabling numerous applications that are critical to modern life. Two important types of PFASs are polymeric and non-polymeric PFAS. Fluoropolymers provide important properties, such as heat and chemical resistance, nonstick, and unique electrical insulating properties. Because of their physical characteristics, these products present no significant risk to human health or the environment. Historically, some fluoropolymers were manufactured in the USA using a production aid known as perfluorooctanoic acid (PFOA). Major manufacturers in the U.S, Europe, and Japan are no longer using PFOA to produce fluoropolymers. Fluorinated polymers made from perfluoroalkane sulfonyl fluorides (PASF) and fluorotelomer iodides (FTI) are used to provide water, oil and stain repellency in textiles, carpet and paper. As non-polymeric derivatives, they are also used in applications such as fire-fighting foams, cleaning products and coatings additives. These products are widely understood not to present toxicity concerns when used as intended. They can, however, degrade to form persistent perfluoroalkyl acids. In the past PASF-based products were based on perfluorooctane sulfonylfluoride (POSF) that can degrade to PFOS [see, e.g, http://chm.pops.int/Implementation/NIPs/Guidance/GuidanceonBATBEPfortheuseofPFOS/tabid/3170/Default.aspx that is referenced in one of the DRAFT CAP chapters]. FTI-based products were based on long-chain fluorotelomer iodides that can degrade to PFOA [insert reference for ECHA Restriction Dossier that is referenced in one of the DRAFT CAP chapters].

Commented [A6]: How can WA state that "many PFAS" degrade into persistent and bioaccumulative chemicals when only PFOS and related salts have been shown to meet the State's established PBT criteria?

Commented [A7]: Shouldn't this paragraph focus on a description of PFOS?

PFAS CAP

The PFAS CAP is proposed to be developed in two phases, an Interim PFAS CAP prepared in 2017 followed by a Final PFAS CAP prepared in 2018. The scope of the Interim PFAS CAP will be defined by the specific recommendations identified and published in the interim document. While the PBT Rule contains a specific list of PFAS chemicals, CAP development provides a more comprehensive review of the chemicals in a particular group. As the PFAS CAP is developed, specific recommendations are likely to focus on subgroups of PFAS.

Commented [A8]: Suggest more specificity. Does that include recommending to have certain PFAS listed as PBT substances?

Due to the accelerated schedule, the focus for discussion, review of actions, and recommendations in the Interim PFAS CAP is expected to be limited. Ongoing review of actions and recommendations will continue into 2018 for the Final PFAS CAP. Issues that are too complicated for the interim timeline will be incorporated into the Final PFAS CAP after additional work in 2018. The issues appropriate for the Interim PFAS CAP schedule will be identified in the November and December Advisory Committee meetings. A tentative schedule for the Interim PFAS CAP is provided in Figure 1. A schedule for the Final PFAS CAP will be developed in early 2018.

Commented [A9]: It is unclear why there is an "accelerated schedule" and how "issues that are too complicated for the interim timeline will be incorporated…. after additional work". What does this mean exactly? What is the category definition of "too complicated" and who decides which issues fall into that category? It would be beneficial to describe this in more detail. The work of the CAP development should be thorough and based on sound science and available data.

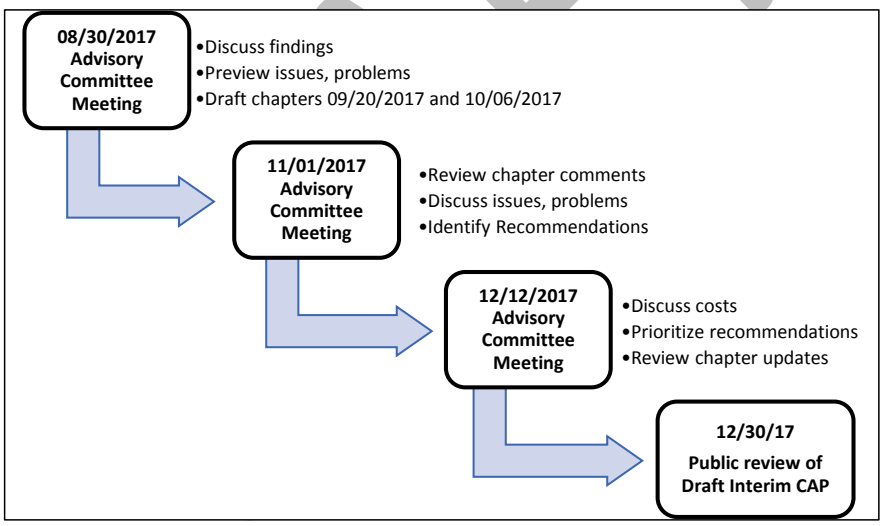

Figure 1 Interim PFAS CAP Schedule

Individual chapters in the PFAS CAP will focus on the PFAS data available and identify important data gaps. The precise list of PFAS mentioned in each chapter reflects the information available. Releases to humans and the environment will focus on available data, which in some areas is very limited. Production and use of PFAS will be limited due to lack of transparency in manufacturer reporting.

Information about PFAS CAP meetings and related documents will be available online at https://www.ezview.wa.gov/?alias=1962&pageid=37105.

Interested parties can subscribe to the Chemical Action Plan listserv to receive updates https://listserv.wa.gov/cgi-bin/wa?A0=CHEMICAL-ACTION-PLAN.

Additional information is available on the Ecology PFAS webpage at http://www.ecy.wa.gov/programs/hwtr/RTT/pbt/pfas.html.

Reference

Buck, R.C., Franklin J, Berger U, Conder JM, Cousins IT, de Voogt P, Jensen AA, Kannan K, Mabury SA, van Leeuwen SP. *Perfluoroalkyl and polyfluoroalkyl substances in the environment: terminology, classification, and origins.* Integrated Environmental Assessment and Management, 2011. **7**(4): p. 513-41.