

PFAS – Demands for Safer Alternatives

December 4, 2018

Berkeley, CA

Per- & Polyfluoroalkyl Substances (PFAS)

- Entirely manmade thousands of formulations in use
- Many are extraordinarily persistent in the environment, cannot be broken down by natural systems
- PFAS are detected in air, water, soil, sludge
- Many bioaccumulate at the top of the food chain in birds, fish, livestock, and humans
- Environmental persistence leads to global distribution via air and water movement – releases here can be significant for communities on the other side of the world



Some Uses & Sources of PFAS



























Source: Green Science Policy Institute, reproduced with permission www.greensciencepolicy.org

PFAS Human Exposure Pathways

- Diet Fish, seafood, garden produce
- Drinking water
- Incidental soil/dust ingestion
- Inhalation may be significant

1 Oliaei et al., 2013. Environ. Sci. Pollut. Res. Manag. 20:1977-1992 2 Domingo, 2012. Environment International 40:187-195



PFAS Health Effects

Animal toxicity

 Causes liver, immune system, developmental, endocrine, metabolic, and neurobehavioral toxicity.

PFOA and PFOS caused tumors in chronic rat studies.



Human health effects associated with PFAS in the general population and/or communities

Associated with kidney and testicular cancer, elevated total cholesterol, accelerated puberty, liver damage, obesity, immune system and thyroid disruption, and other health problems.





Northeastern Univ PFAS Contamination Site Tracker https://pfasproject.com/pfas-contamination-site-tracker/



Meredith Williams BizNGO 2018 Annual Meeting December 4, 2018

California Environmental Protection Agency

Department of Toxic Substances Control

Alternatives already available for most uses

Inherently stain-resistant fibers such as:

- Wool
- Polypropylene
- Polyethylene terephthalate (PET)
- Polytrimethylene terephthalate (PTT)
- etc.

Chemical alternatives such as:

- Sulfonation
- Nanoparticle silicate clay-based repellent (Invista 2017)
- Non-fluorinated Duratech®
- Eco-Ensure
- Siloxane and silicone polymers
- Hydrocarbons
- Polyurethanes
- Dendrimers





- Manufacturer evaluation
- Public comment
- CBI protections
- Life Cycle Thinking







Factors to be considered

- Public health impacts
- Environmental impacts
- Waste and end-of-life
- Environmental fate
- Materials and resource consumption
- Physical chemical hazards
- Physicochemical properties
- Exposure pathways and life cycle segments
- Product function and performance
- Economic impacts



Division 4.5, Title 22, California Code of Regulations Chapter 54 Green Chemistry Hazard Traits, Toxicological and Environmental Endpoints and Other Relevant Data

Alternatives Analysis Guide Coverage

- AA framework
- Product requirements and alternatives
- **Relevant factors**
- Impact assessments
- Screening of alternatives
- Exposure
- Life cycle impacts
- **Economic impacts**
- Informational needs in AA
- Selection of alternatives
- Self-evaluation of AA



Alternatives Analysis Guide

TMENT OF TOXIC SUBSTANCES CONTROL AFER PRODUCTS AND WORKPLACES PROGY

Version 1.0

Potential adverse impacts to waste management and at product end-of-life





Conceptual exposure model





13

The challenge to manufacturers: What are the trade offs? What are the company's values and criteria? What information is available? What are the data gaps? What will meet the performance criteria? Does this alternative have a downside?



Alternatives Analysis Guide – tools and resources for California's AA process <u>https://dtsc.ca.gov/SCP/AlternativesAnalysisGuidance.cfm</u>

Alternatives Assessment example review <u>https://dtsc.ca.gov/SCP/Alternatives_Analysis_Examples.cfm</u>

Preliminary AA template <u>https://www.dtsc.ca.gov/SCP/Preliminary_AA_Report_Template.cfm</u>





How a local government choses safer alternatives: PFAS-free firefighting foam

Holly Davies, PhD, Research Scientist



Local Hazardous Waste Management Program in King County, Washington

Local Governments for Health and the Environment: King County, City of Seattle, Sound Cities Association



Local Hazardous Waste Management Program in King County

- Multi-agency regional program
- 2 million residents
- 60,000 businesses
- Prevention and management
- Technical assistance and financial incentives
- Equity and Social Justice



Working Together to Reduce Hazardous Waste www.HazwasteHelp.org

Safer Alternatives Strategy

- Leveraging TSCA
- Increase adoption and avoid regrettable substitutions
- Uniform system
- Regional partnerships
- Equity lens
- Examples
 - Dry cleaning (PERC)
 - Autobody paint
 - Methylene chloride
 - Residential cleaning





Find a product with these eco-logos on the front or back.

If you can't find products with these logos, search online or call us and we will try to get these products on local shelves.





Washington State

- Drinking Water
 - Additional testing
 - Rulemaking for state levels
- Food contact paper ban (RCW 70.95G)
 - Entire class of PFAS
 - After Ecology alternatives assessment
- Class B firefighting foam (RCW 70.75A)
 - Entire class of PFAS
 - Use in training as of July 1, 2018
 - Sale as of July 1, 2020, with exceptions
 - Firefighting PPE notification to purchasers



State of Washington





Firefighting Foam Safer Alternatives

- Purchasers
 - Avoid regrettable substitutes
 - Focus on performance and cost
- Hazard and Exposure
- Lack of information



3. Composition/ Information on Ingredients

is a blend of organic surfactants being anionic, nonionic and amphoteric surfactants does not contain PFOS or PFOA.



Lack of hazard information

SDS

3. Composition/information on Ingredients

3.1. Mixture

Chemical name CAS No weight-% 107-41-5 2-Methyl-2,4-pentanediol 5 - 10 Proprietary Hydrocarbon Surfactants Proprietary 5 - 10 Proprietary Hydrocarbon Surfactants 3 - 7 Proprietary Proprietary Hydrocarbon Surfactant 1 - 5 Proprietary Propan-2-ol 67-63-0 1 - 5 3-Butoxy-2-propanol 5131-66-8 1 - 5

The following component(s) in this product are considered hazardous under applicable OSHA(USA)

Data Commons- GreenScreen

Actions	CASRN	Chemical Name	Score	Group I Human				Group II and II* Human									Ecotox			Fate		Physical		Non-GSLT		LT	Mult	Other	
				c	м	R	D	E	AT	ST	ST	N	N	SnS	SnR	IrS	IrE	AA	CA	АТВ	Р	в	Rx	F	РВТ	GW	0	Mult	Other
										sin	rep	sin	rep																
Û	107-41-5	2-METHYL-2,4-PENTANEDIOL	LT-UNK				H-L		L				vH-L			н	н							М				М	+
Û	67-63-0	Isopropyl Alcohol	BM-2	L	L	М	м	DG	L	vH	L	м	L	М	DG	М	н	L	L	-	٧L	٧L	Н	н	-	-	-	-	R
Û	5131-66-8	BUTOXYPROPANOL	LT-UNK						М							н	н			М				М				М	+

Safer Alternatives







- Third party certification
 - Disclosure and evaluation
 - GreenScreen hazard screen- Benchmark (1-4, U)
 - Lab analysis
- 24 manufacturers/100 F-free foams



Holly Davies, Ph.D. hdavies@kingcounty.gov

All chemistry is green chemistry



Adopting Safer Alternatives

Jen Jackson, Toxics Reduction & Healthy Ecosystems Program Manager



Precautionary Principle



Take anticipatory action to prevent harm, even if there is lack of full scientific certainty.



Drivers - Employee & Public Health





Drivers – Environmental Quality





Drivers – Zero Waste & Proper Disposal





Our Priorities – Six Classes

- heavy metals
- solvents (VOCs)
- plasticizers
- flame retardants
- chlorinated antimicrobials
- fluorinated chemicals







Is it necessary?

- Seek strong third party certifications
- Assess performance
- Ensure enough products on the market
- Understand cost implications
- Develop compliant product lists
- Verify claims, when we can





Case Study: City Carpet Purchases



 Strong third-party certification? What are the performance needs/issues? If we eliminate the six classes, are there enough products on the market? • What are the cost implications? Conducted survey of manufacturers tp create product list Verified claims

Case Study: City Carpet Purchases



Case Study: PFAS in Foodware





Product Testing





Successful procurement contract





New Foodware Ordinance







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