Toxic Chemicals in Disposable Food Service Ware

CEH/RPN Webinar

November 16, 2017

CEH

Today's Audience

> 400 REGISTRANTS

- **~ 42% State, local and federal agencies**
- **~ 9% Nonprofits**
- **~ 18% Private sector**
- **~ 31% Education & Healthcare**

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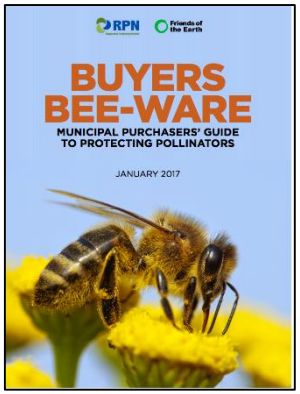
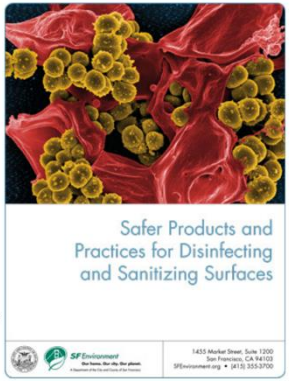
Responsible Purchasing Network





RPN is a nonprofit network that develops cutting-edge tools to help government agencies, public institutions, and businesses purchase sustainable products and services.

Center for Environmental Health (CEH)

A non-profit organization dedicated to protecting public health from exposures to toxic chemicals.

The Center for Environmental Health works with large purchasers to utilize their buying power to incentivize the production of environmentally preferable products

www.ceh.org

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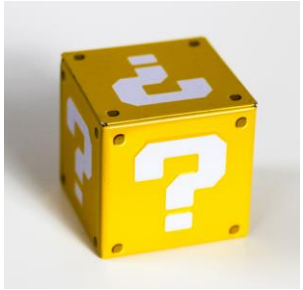
Audio and Recordings

- Participants are muted. Communicate technical questions (about sound, etc.) through the **CHAT BOX** in your GoToWebinar application.



- Presentation slides will be posted on RPN's and CEH's websites.

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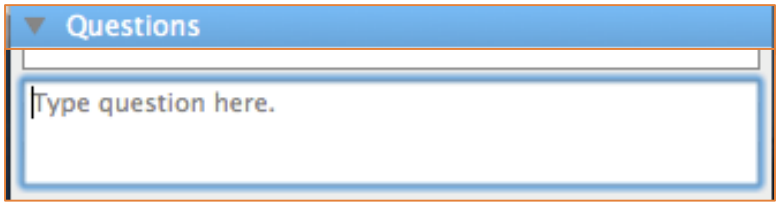
Questions?

Submit questions for presenters at any time by typing them into the GoToWebinar QUESTION BOX.



We will compile and answer them…

- **After each presenter *and***
- **At the end of the webinar**

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Presenters

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Responsible Purchasing Network

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and Green Procurement,
State of New York

Andrew Lindstrom
Research Scientist
US EPA National Exposure
Research Laboratory

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RPN's Work on Safer FSW

SUSTAINABLE BIOMATERIALS COLLABORATIVE

BioSpecs Purchasing Specifications for Compostable Biobased Food Service Ware (Mandatory Criteria and Additional Desirable Criteria)[1]

Green Purchasing Best Practices: Compostable Food Service Ware

Prepared for:

Washington State Department of Enterprise Services (DES)

Funded by:

National Association of State Procurement Officials (NASPO)

Research and Writing by:

Responsible Purchasing Network
November 2012

What is Food Service Ware?

- Cups and lids (hot/cold)
- Plates and bowls
- Utensils, stirrers, straws
- Take-out containers
- Trays
- Paper wrappers
- Coffee “sleeves”
- Napkins

Why Is Disposable Food Service Ware a Problem

- **Generates significant waste**
  - **Landfill and incinerator emissions**
  - **Climate impacts**
  - **Ocean pollution**
- **Toxic chemical concerns**
  - **Polystyrene**
  - **Fluorinated non-stick chemicals**

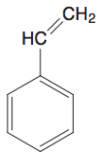
Problems with Polystyrene

Styrene

CAS No. 100-42-5

Reasonably anticipated to be a human carcinogen

First listed in the *Twelfth Report on Carcinogens* (2011)

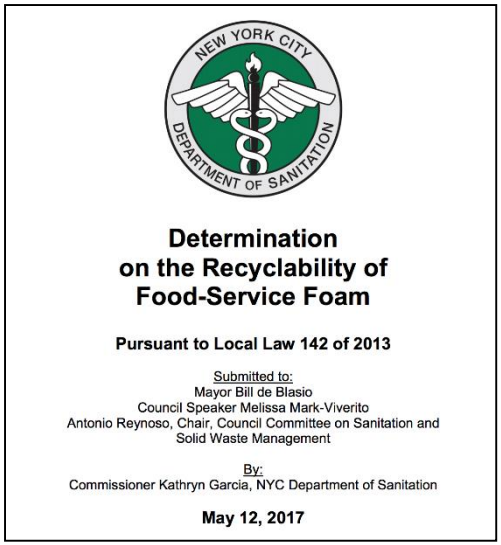


Carcinogenicity

Styrene is *reasonably anticipated to be a human carcinogen* based on limited evidence of carcinogenicity from studies in humans, sufficient evidence of carcinogenicity from studies in experimental animals, and supporting data on mechanisms of carcinogenesis.

- **Reasonably anticipated to be a human carcinogen (2011, National Toxicology Program)**
- **Difficult to recycle**
  - **Contaminated with food**
  - **Bulky**

Polystyrene Food Service Ware is Very Difficult to Recycle



Determination on the Recyclability of Food-Service Foam

Pursuant to Local Law 142 of 2013

Submitted to:
Mayor Bill de Blasio
Council Speaker Melissa Mark-Viverito
Antonio Reynoso, Chair, Council Committee on Sanitation and Solid Waste Management

By:
Commissioner Kathryn Garcia, NYC Department of Sanitation

May 12, 2017

A. EXECUTIVE SUMMARY

As described herein and summarized below and pursuant to Local Law 142 of 2013, the New York City Department of Sanitation ("DSNY" or "the Department") determines that Food-Service Foam or post-consumer Food-Service Foam **cannot be recycled** in a manner that is economically feasible or environmentally effective for New York City.

200 Scientists Concerned About Highly Fluorinated Non-Stick Chemicals

ON THIS PAGE

- The Madrid Statement
- Sign the Madrid Statement
- Authors and Signatories
- Resources
- In the Media

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http://greensciencepolicy.org/madrid-statement/

- Although some of the long-chain PFASs are being regulated or phased out, the most common replacements are short-chain PFASs with similar structures, or compounds with fluorinated segments joined by ether linkages.
- While some shorter-chain fluorinated alternatives seem to be less bioaccumulative, they are still as environmentally persistent as long-chain substances or have persistent degradation products. Thus, a switch to short-chain and other fluorinated alternatives may not reduce the amounts of PFASs in the environment. In addition, because some of the shorter-chain PFASs are less effective, larger quantities may be needed to provide the same performance.
- While many fluorinated alternatives are being marketed, little information is publicly available on their chemical structures, properties, uses, and toxicological profiles.
- Increasing use of fluorinated alternatives will lead to increasing levels of stable perfluorinated degradation products in the environment, and possibly also in biota and humans. This would increase the risks of adverse effects on human health and the environment.

Introduction to Per- and Polyfluoroalkyl Substances (PFAS) In Food Service Ware

Andrew B. Lindstrom

U.S. Environmental Protection Agency
National Exposure Research Laboratory
Research Triangle Park, NC

Toxic Chemicals in Disposable Food Service Ware
November 16, 2017

Overview

Introduction to PFAS - terminology, chemistry

Chemical and physical properties

Sources in the environment

Human exposure pathways

Controls and regulations

Health effects

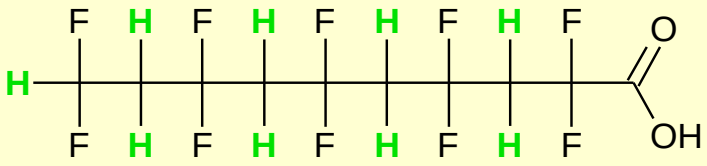
Per- and Polyfluoroalkyl Substances (PFAS)

- PFAS are entirely manmade – no natural sources and literally thousands of different formulations in use
- Many PFAS are extraordinarily persistent in the environment, cannot be broken down by natural systems
- PFAS are detected in all environmental media – air, water, soil, sludge
- Like other persistent organic pollutants, many PFAS bioaccumulate in animals at the top of the food chain – 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

Per- and Polyfluoroalkyl Substances (PFAS) Chemistry 101

Thousands of PFASs in production of industrial and consumer products.

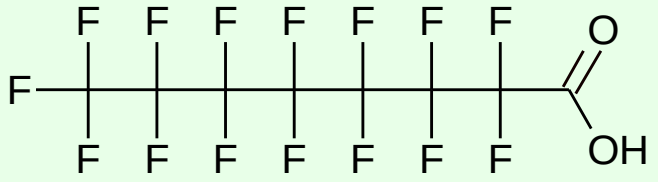
Poly fluorinated = many fluorines



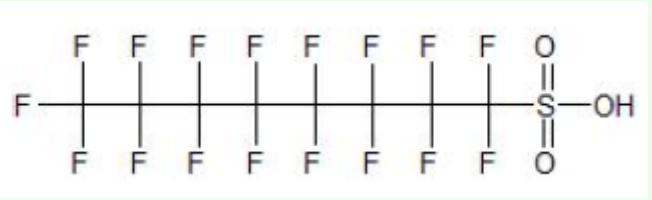
Polyfluorinated carboxylic acid from the production of polyvinylidene fluoride (PVDF) plastic

Newton et al., 2017. Novel polyfluorinated compounds identified downstream of manufacturing facilities near Decatur, AL using high resolution mass spectrometry

Per fluorinated = fully fluorinated



Perfluorooctanoic acid (PFOA ,C-8)

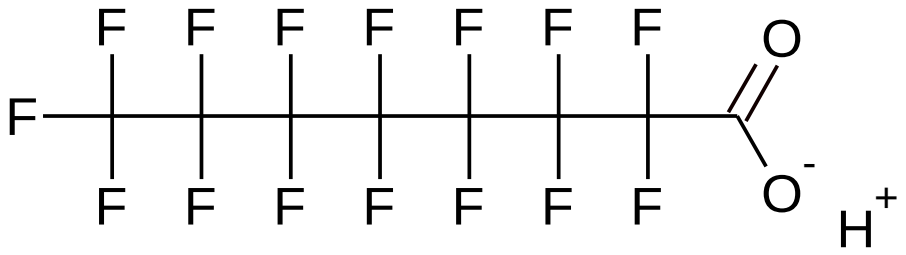


Perfluorooctanesulfonate (PFOS)

Very stable (C-F bond energy 485 kJ/mol)
(C-C 346, C-N 305, C-O 358, C-Cl 327 kJ/mol)

Long-Chain PFAS

Long-chain = have longer carbon chain lengths and include carboxylic acids C_8 and longer



Long-chain also includes sulfonic acids C_6 and longer

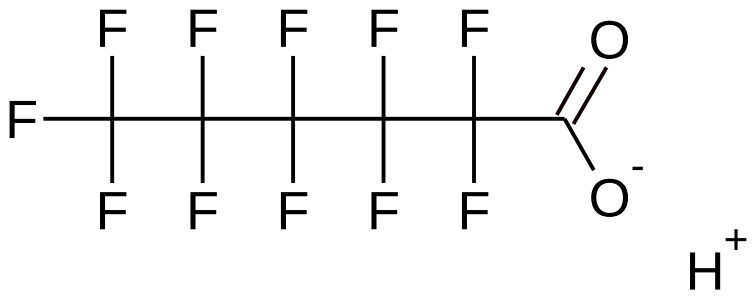
Long-chain compounds are a concern:

- They bioaccumulate, have long half lives in blood, and are thought to be more toxic
- But, less mobile compared to short chain PFAS.

PFOA human half life ($t_{½}$) = 3.8 years

Short-Chain PFAS

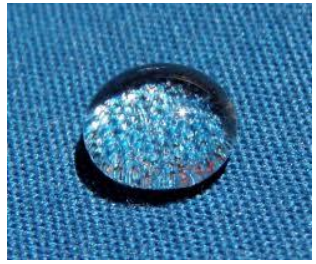
Short-chain = shorter carbon chain lengths and includes
carboxylic acids C_7 and shorter,
sulfonic acids C_5 and shorter



Short-chain compounds tend have shorter half-lives in blood, but they are more mobile and not easily removed during drinking water treatment.

Perfluorohexanoic acid (PFHxA) human half life ($t_{½}$) = 32 days.

Chemical and Physical Properties



- Properties of PFAS range depending on carbon chain lengths and functional groups.
- PFAS generally occur as mixtures and are not well characterized.
- PFAS provide desirable performance because they repel both oil and water:
  - The fluorinated carbon tail is both lipophobic/oleophobic (repelled by fats and oils) and hydrophobic (repelled by water).
- As a result of these unique surfactant properties and their stability, they are common surfactants and stain preventers.

Uses & Sources of PFAS

Food contact surfaces such as containers, pizza boxes, fast food wrappers, popcorn bags, etc.

Polishes, waxes, and paints

Stain repellants for carpets, clothing, upholstered furniture, etc.

Cleaning products

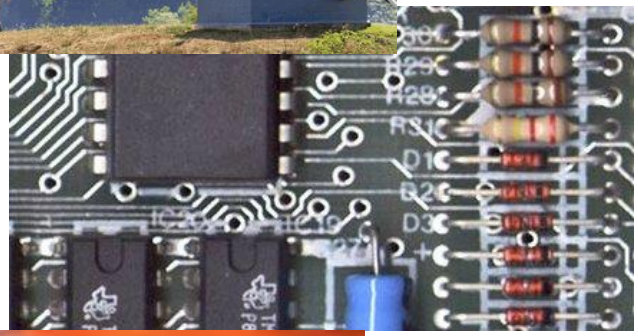
Uses & Sources of PFAS

Wastewater treatment plants, landfills, and leachates from disposal of consumer and industrial products containing PFASs

Land where wastewater treatment plant biosolids was applied

Direct release of PFAS products into the environment – such as use of AFFF in training and emergency response

Uses & Sources of PFAS



Fluorochemical production facilities

Mist suppression for chrome plating

Electronics manufacturing

Oil and mining for enhanced recovery

Performance chemicals such as hydraulic fluid, fuel additives, etc.

Human Exposure Pathways

Major pathways

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

Insignificant or minor pathways

- Dermal absorption

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

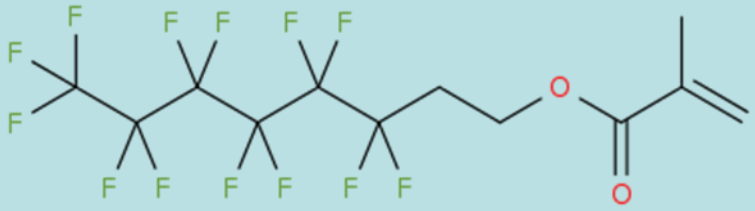
n=1,255

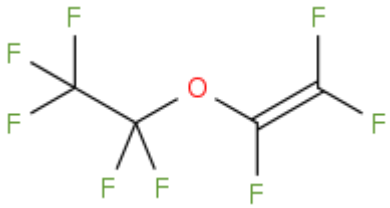
n= 66 include “fluoro” in name

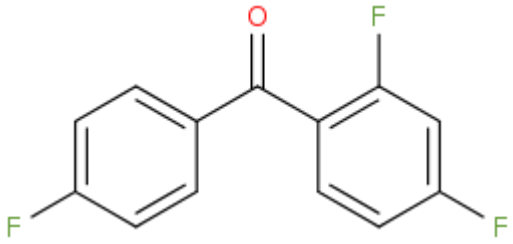
http://www.accessdata.fda.gov/scripts/fdcc/index.cfm?set=FCN&sort=FCN_No&order=DESC&startrow=1&type=basic&search=fluoro

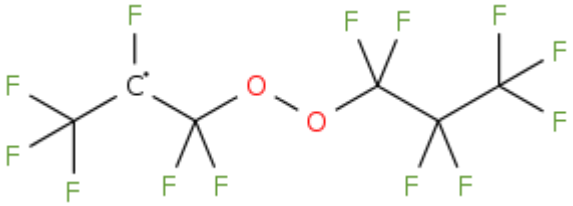
“Fluoro” Substructures in Database

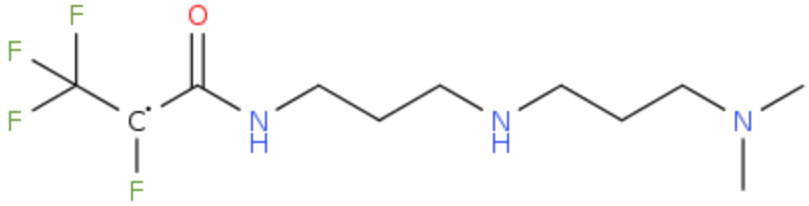
n=23 include











US Environmental Protection Agency

PFOA Stewardship Program

In January 2006, USEPA started this program to help minimize impact of PFOA in the environment

Eight major international companies have agreed to participate (including 3M, DuPont, Asahi Glass, Daikin)

Agreement to voluntarily reduce factory emissions and product content of PFOA and related compounds* on a global basis by 95% no later than 2010

Agreement to work toward total elimination of emissions and product content of these compounds by 2015

Based on emissions and content determinations made for 2006

* Includes PFOA, precursor chemicals that can break down to PFOA, higher homologues (C9 and larger)

US Environmental Protection Agency
Health Advisories

Health Advisory levels for PFOS and PFOA in drinking water

PFOS alone = 70 ng/L
PFOA alone = 70 ng/L
PFOS + PFOA = 70 ng/L

"Protective" long term (chronic) exposure level

* Some experts calling for further reduction in these standards to be truly protective for long term exposures

PFOS = 1 ng/L PFOA = 1 ng/L

* Immunotoxicity of perfluorinated alkylates: calculation of benchmark doses based on serum concentrations in children Grandjean, P ; Budtz-Jorgensen, E ;Environmental Health (12:35) DOI: 10.1186/1476-069X-12-35, APR 19 2013

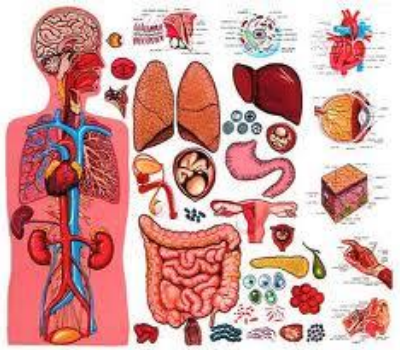
PFAS Health Effects Summary

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 PFC(s) in the general population and/or communities with contaminated drinking water include:

- ↑ cholesterol
- ↑ uric acid
- ↑ liver enzymes
- ↓ birth weight
- ↓ vaccine response
- Thyroid disease
- Osteoarthritis
- Diabetes
- Testicular and kidney cancer
- Pregnancy-induced hypertension
- Ulcerative colitis
- Effects in young adulthood from prenatal exposures
  - *Obesity in young women.*
  - *↓ sperm count in young men.*



Questions?

Email: lindstrom.andrew@epa.gov

Polling Question #1

How is most of the food service ware handled in your facilities?

VOTE NOW

All MOLDED FIBER Products Tested Positive for High Levels of Fluorine

- **Types of Materials**
  - **Recycled paper**
  - **Agricultural Waste**
    - **Sugarcane/Bagasse**
    - **Wheat straw**

- **Types of FSW Items**
  - **Plates, Bowls and Clamshells**
  - **Includes some products approved by BPI, Cedar Grove, Cradle to Cradle, Green Seal**

Products that Did NOT Test Positive for High Levels of Fluorine

- **Hot Cups + Lids**
- **Cold Cups + Lids**
- **Paper Soup Containers**
- **PLA Takeout Containers**
- **Cutlery**
- **Straws and Stirrers**
- **Napkins**
- **Coffee Sleeves**

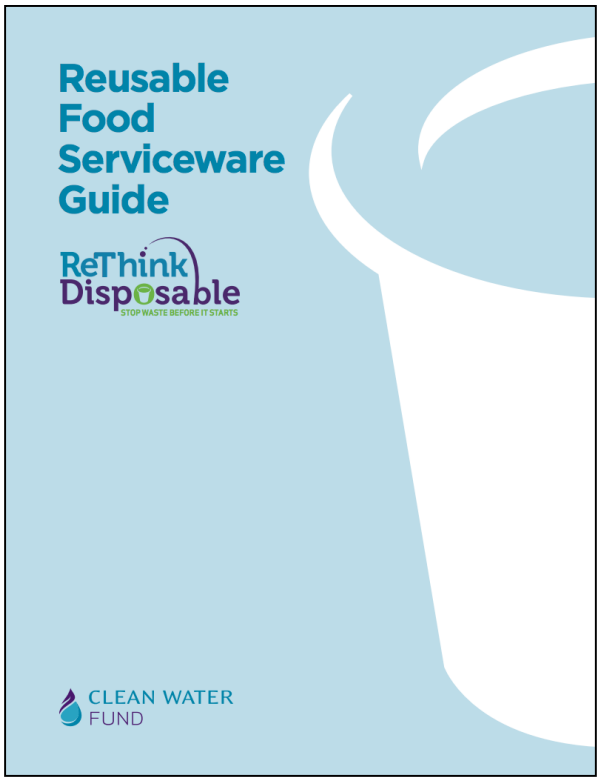
Safer Food Service Ware

Attributes of Sustainable FSW

- **Reusable**
- **Compostable**
- **Recyclable**

- **Other Environmental Benefits**
  - **Made with Recycled Content (plastic, paper, etc.)**
  - **Promote Sustainable Forestry (Forest Stewardship Council (FSC) certified**

Reusable Food Service Ware



Reusable


RETURN
CONTAINERS HERE
TO GET A
NEW TOKEN
HOW TO
RETURN
CONTAINERS
GRAB & GO 2.0
EAT.
RETURN.
REPEAT.

Commercially Compostable

- **Products certified by the Biodegradable Products Institute (BPI) that do not contain PFAS**
  - **Bioplastic (e.g., PLA)**
  - **Paper coated with bioplastic**

- **Products on Cedar Grove's *Approved Products List* that do not contain PFAS**
  - **Sheet paper without bioplastic**
  - **Clay-coated paper**
  - **Wooden cutlery and stir sticks**

Safer Food Service Ware

Clear PLA Products

- **Replacement for these types of products with PFAS**
  - **Take-out Containers**
  - **Portion Cups**

- **Benefits**
  - **Certified compostable (BPI)**

- **Drawbacks**
  - **More expensive than molded fiber products**
  - **For cold food only**

Safer Food Service Ware

PLA-Coated Paper Products

- **Replacement for these types of products with PFAS**
  - **Soup Containers**
  - **Other Take-out Containers**
- **Benefits**
  - **Certified compostable (BPI)**
  - **Some products contain recycled content**
  - **Low-chemical footprint plastic**
- **Drawbacks**
  - **More expensive than molded fiber products**
  - **Many organizations lack composting**

Safer Food Service Ware

Clay-Coated Paper Products

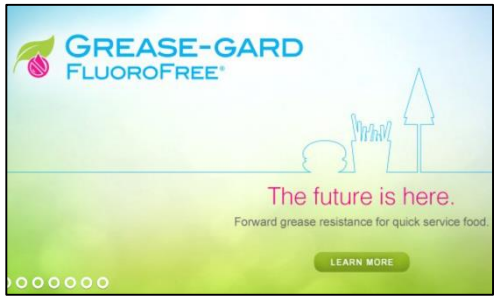
- **Replacement for these types of products with PFAS**
  - **Plates**
  - **Soup Bowls**

- **Benefits**
  - **Certified compostable (BPI) and Cedar Grove Approved**
  - **Less expensive than PLA-coated paper**
- **Drawbacks**
  - **More expensive than molded fiber products**

Safer Food Service Ware

Untreated or Waxed Paper Products

- Replacement for these types of products with PFAS
  - Plates
  - Portion Cups
  - Food service bags and wraps



- Benefits
  - Certified compostable (BPI)
  - Some products competitively priced

- Drawbacks
  - Untreated paper may not perform well for all applications
  - Some waxes are petroleum-based

Easily Recyclable

- **Recyclable in Most Communities**
  - **#1 PET plastic (64.5% of communities accept)**
  - **#5 Polypropylene (61.1% of communities accept)**
  - **Paper coffee sleeves (most communities accept)**

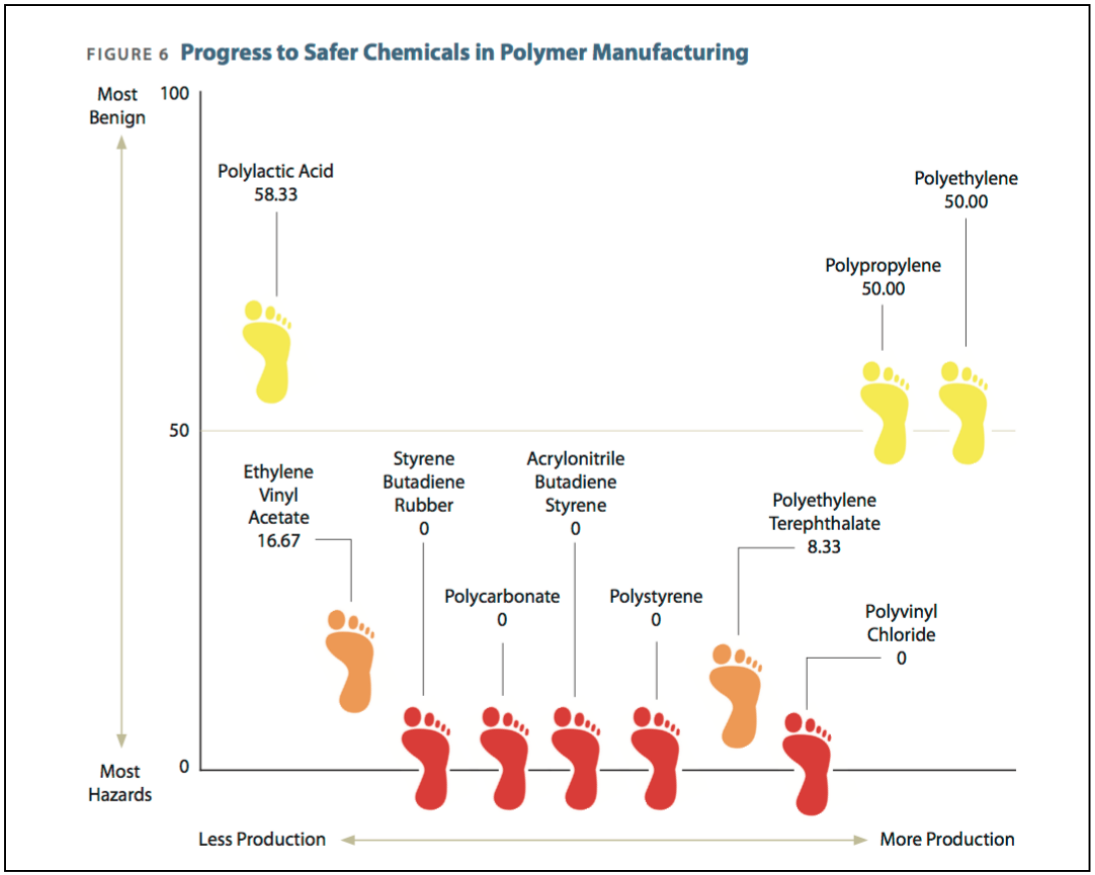
- **Not Recyclable in Most Communities**
  - **Too contaminated with food (most plates, bowls, takeout containers, napkins)**
  - **Too small to sort (straws, portion cups, cutlery)**
  - **Most paper products (non-recyclable liner, etc.)**

Safer Food Service Ware

Recyclable Plastic (PET/Polypropylene)

- Replacement for these types of products with PFAS
  - Take-out Containers
  - Portion Cups
- Benefits
  - Low chemical footprint
  - Some products have recycled content
- Drawbacks
  - More expensive than molded fiber products
  - Some products don't work for hot applicatio
  - May be "down-cycled"

Chemical Footprint of Plastics



Source: **Clean Production Action, *The Plastics Scorecard***

Other Environmental Attributes

- **Recycled Content**

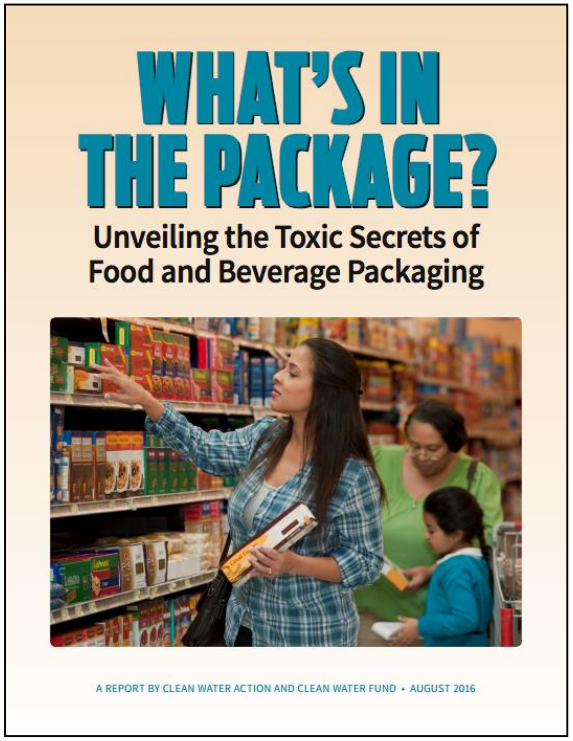
  Total Recycled (TR)/Post-Consumer Recycled Content (PCRC)

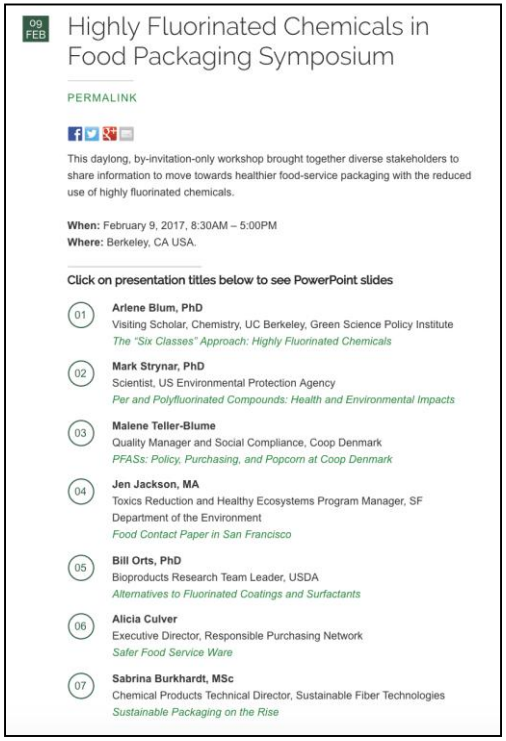
  - **Recycled PET Clear Cups (10-25% PCRC)**
  - **Recycled Paper Cups (10-20% PCRC)**
  - **Paper Coffee Sleeves (100% TR/60-100% PCRC)**

- **Sustainably Sourced Paper/Wood – FSC certification**
  - **Paper cups, coffee sleeves, wooden stirrers, napkins**
- **Chlorine-free Bleaching**
  - **Coffee sleeves, Paper Cups**

- **Water-Based Inks/Glues**
- **Made with Renewable Energy (Green-e Certified)**

Additional Resources





http://greensciencepolicy.org/pfass-in-food-packaging-2017-agenda/

Questions/Contact Info

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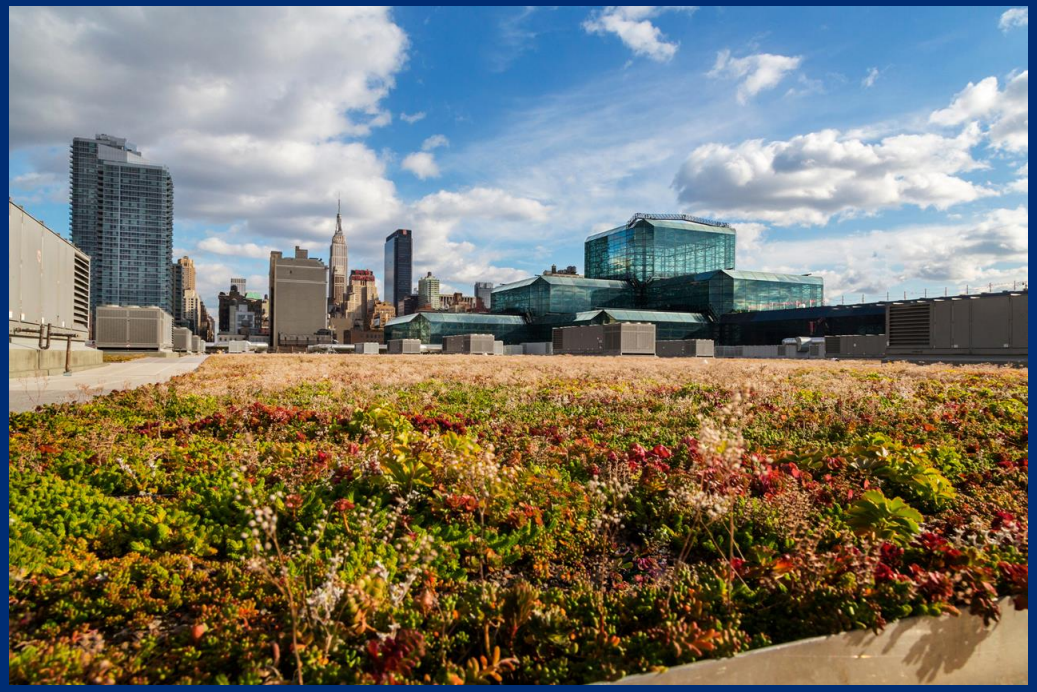
NEW YORK
STATE OF
OPPORTUNITY

Department of
Environmental
Conservation

Greening the Purchase of Food Service Containers and Packaging in New York State

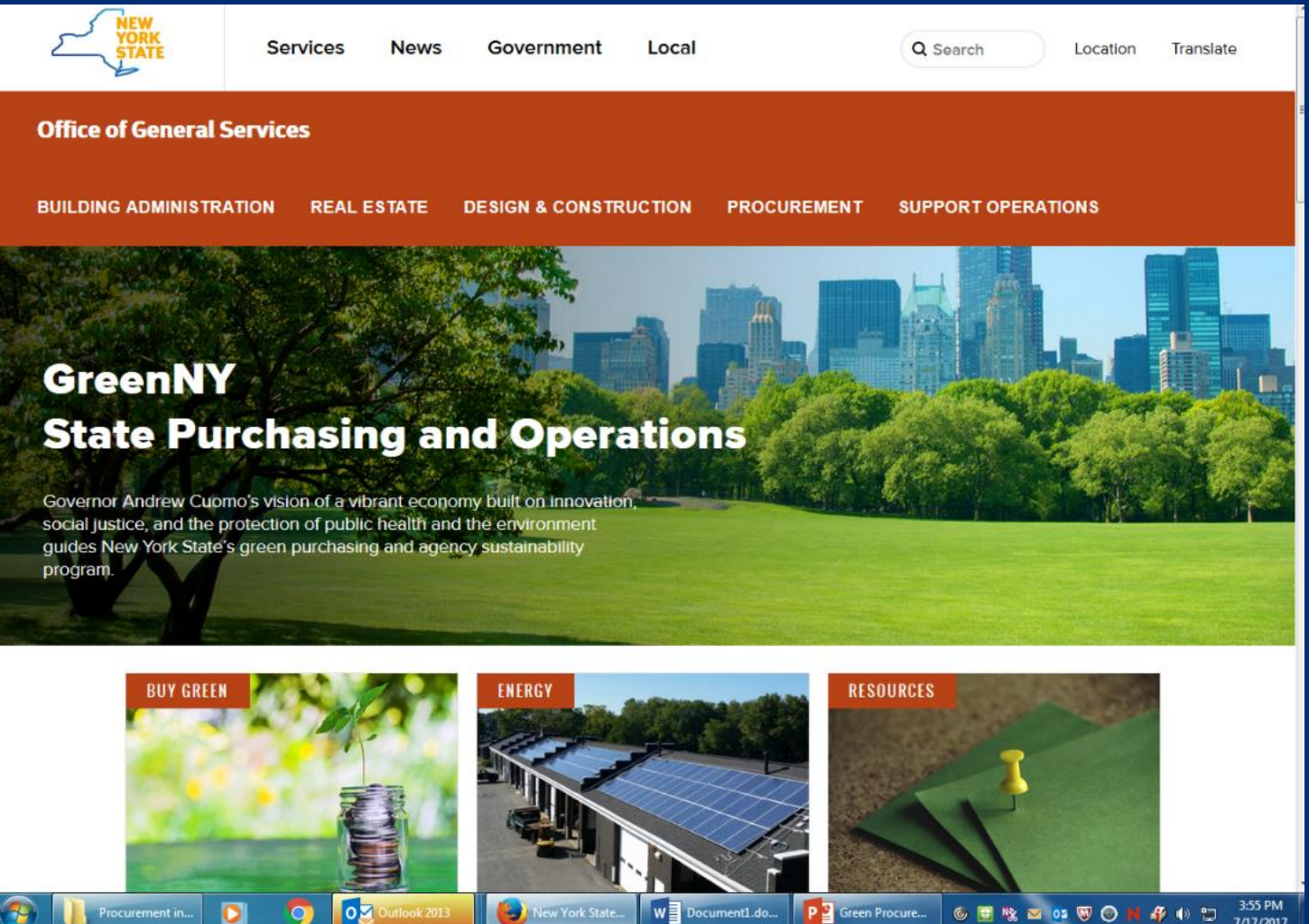


Elizabeth Meer
Special Assistant for Pollution Prevention and Green Procurement
Commissioner's Designee to Co-Chair
the EO 4 Interagency Committee on Agency Sustainability and Green Procurement

November 16, 2017

New York's Green Purchasing and Agency Sustainability Program

https://www.ogs.ny.gov/greenny/Default.asp



NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

Comprehensive and Holistic:

- Waste reduction & reuse
- Recycling & composting
- Toxics use reduction
- Energy efficiency
- Renewable energy
- Transportation
- Water & Natural Resources
- 73 covered agencies
- Purchase $8 B/year

Buy Green

52 Green Specifications covering 90+ products:

- Single use food containers
- Computers
- Cleaning products
- Pest management

Green products available on 20 contracts:

- Cleaning Products (all green EPP contract with MA)
- Computers (aggregate buy all green)
- Paper (some all green)
- Lamps (many green offerings)
- Floor coverings (many green offerings)

New York won SPLC's highest honor in 2017: **Overall Sustainable Purchasing Program**

OGS launched dedicated Green Procurement Team in 2017

Chemicals to Consider in Green Procurement

Policy Statement Adopted 2010

What chemicals do we know, or have reason to believe, are hazardous?

What products contain such chemicals?

Food Service Containers and Packaging

- Tested containers on contract and offered by preferred sources in summer 2016
- Responsible Purchasing Network and the Green Science Policy Institute
- High levels of fluorine indicated presence of short-chain PFCs in all molded ware offerings

Concerns

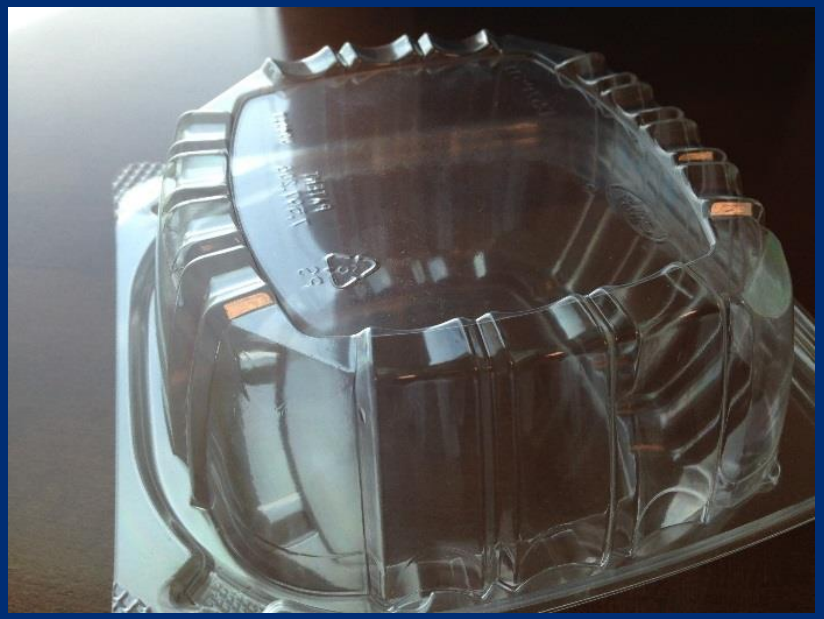
- High profile contamination in Hoosick Falls, Petersburgh and Newburgh makes NY very sensitive to PFA contamination
- Existing specification required purchase of compostable ware to maximum extent practicable

New Draft Specification on "Food Service Containers and Packaging"

- Amended existing spec to prohibit containers and packaging with intentionally added PFCs, broadly defined
- Expanded to encourage the use of reusable containers FIRST
- Established clear hierarchy of:
  - Reusable
  - Compostable without PFCs --
  - Recyclable without polystyrene – PET and Polypropylene called out as good
  - Recycled and sustainably Harvested
- Tentatively Approved April, 2017. Formal comment period ended September. Anticipate finalization at next Interagency Committee meeting (no later than April 2018).

Why avoid polystyrene?

- Styrene is “reasonably anticipated to be a human carcinogen” (NTP)
- Slow to degrade, common in litter
- No facilities recycle polystyrene in NYS



Procurements

Food service products are offered through:

- The New York State Preferred Source Program for People who are Blind (a preferred source),
- The New York State Industries for the Disabled (a preferred source)
- OGS centralized contracts for
  - Food, Retail (Group 02450, Award 22688)
  - Food (Group 02450, Award 22794)

Disposable food service products may also be available through other OGS centralized contracts such as Industrial and Commercial Supplies (Group 39000, Award 22918) and Miscellaneous Office Supplies (Group 23000, Award 22790).

Outreach to Vendors

Letters were sent to preferred sources and contractors in June of 2017:

- Outlined the proposed changes to the specification
- Described the specification's goal of not offering products that contain PFC's or polystyrene on state contracts or through preferred sources
- Asked that products not in compliance with the specification be removed

Looking Ahead

- Finalize specification
- Work with preferred sources & contractors
- Identify alternatives: compostable with recycled content
- Partner with other jurisdictions
- Partner with manufacturers

Thank You

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NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

Polling Question #2

What is your biggest challenge in purchasing environmentally sustainable food service ware?

VOTE NOW

CEH

Purchasers Can Move the Market

YAHOO!

AUTODESK

UNIVERSITY OF CALIFORNIA SANTA CRUZ

PARTNERS

GCI GENERAL CONTRACTORS

HEALTHY BUILDING SCIENCE

naturepedic

CEH

MASSACHUSETTS

ONEWORK PLACE

new resource bank

SF Environment

Dignity Health

KAISER PERMANENTE®

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MULTNOMAH COUNTY

THE HONEST CO.

STAPLES

CITY OF PORTLAND, OREGON 1851

HDR

TRILLIUM ASSET MANAGEMENT

PERKINS + WILL

Hackensack University Health Network

Kay Chesterfield

5 Things Purchasers/ Organizations Can Do

1. Participate in Product Testing
2. Letter to/Meeting with Suppliers
3. Use Model Specifications
4. Prefer Non-Fluorinated Products
5. Letter to Organizations Addressing Disposable Food Service Ware

CEH

Free Product Testing Available

- Organizations can have samples tested at NO cost
- Provides organizations with critical information for discussions with suppliers
- Contributes to the body of testing results that will yield list of preferred products
- To participate send email to **judy@ceh.org** or **sue@ceh.org**

CEH

Product Spreadsheet

- Results of product testing will be publicly available and searchable
- Spreadsheet will indicate which products are fluorinated or non-fluorinated
- Report with preferred alternatives end of 2017

CEH

Letter to Suppliers/ Distributors

- Incentive for manufacturers and distributors to investigate safer alternatives
- Sample language will be available
- Create a Race to the Top!

CEH

Use Model Specifications

~~Single Use~~ Food Service Containers and Packaging

Covered Products:

Food service containers and packaging, including but not limited to plates, bowls, and hot and cold cups; sandwich or other types of food wrappers; food trays; and food take-out containers (including but not limited to containers with hinges, folding closures, or lids).

Goal:

The goal of this guidance document is to increase sustainable practices in the State of New York's food service operations by encouraging the purchase and use of reusable food service containers and establishing minimum specifications for single-use food service containers and packaging. The specifications establish a hierarchy of environmentally beneficial attributes as follows: reusable; compostable in a commercial or municipal facility; easily recyclable; and made with a minimum percentage of post-consumer recycled content, sustainably harvested content, or other environmental attributes. An additional goal is that covered products purchased by affected entities, offered by preferred sources, or on State contracts will not contain perfluorinated chemicals(PFCs) or polystyrene.

https://www.ogs.ny.gov/greenny/docs/2017/SingleUseFoodContainerAmendments.pdf and http://mission.sfgov.org/OCA_BID_ATTACHMENTS/FA50491.pdf

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Specify Non-Fluorinated/ Sustainable Products

- Purchase reusables whenever possible
- Specify products that are certified compostable and do not contain fluorinated chemicals
- If composting facilities are not available, specify recyclables that are Polypropylene or PET. Not polystyrene.

CEH

Buyer Beware!

- "PFOS and PFOA Free" ≠ free of all fluorinated treatments.
- Many companies mistakenly believe the new fluorinated alternatives are "safe" or "PFAS-free."
- Claims of FDA or EPA Approval does not mean "safe"

CEH

Letter to Certification and Standards Organizations

- Let certification/standards organizations know that fluorinated products should not be certified as compostable or sustainable
- Model language/group sign-on letter will be available

CEH

Questions?

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