



GREEN SCIENCE
POLICY INSTITUTE

Tackling Toxics: For Healthier Products, People & Planet

Arlene Blum, Ph.D.
Chemistry, UC Berkeley
Green Science Policy Institute

July, 2019







Brominated Tris Flame Retardant

Tris (2,3-dibromopropyl) phosphate

- In children's sleepwear 1975 to 1977
- Up to 10% of the weight of fabric
- In children's urine
- Mutagen and possible carcinogen











Science, January 7, 1977

Flame-Retardant Additives as Possible Cancer Hazards

The main flame retardant in children's pajamas is a mutagen and should not be used.

Arlene Blum and Bruce N. Ames



**U.S. Consumer Product
Safety Commission**

TRIS-Treated Children's Garments Banned

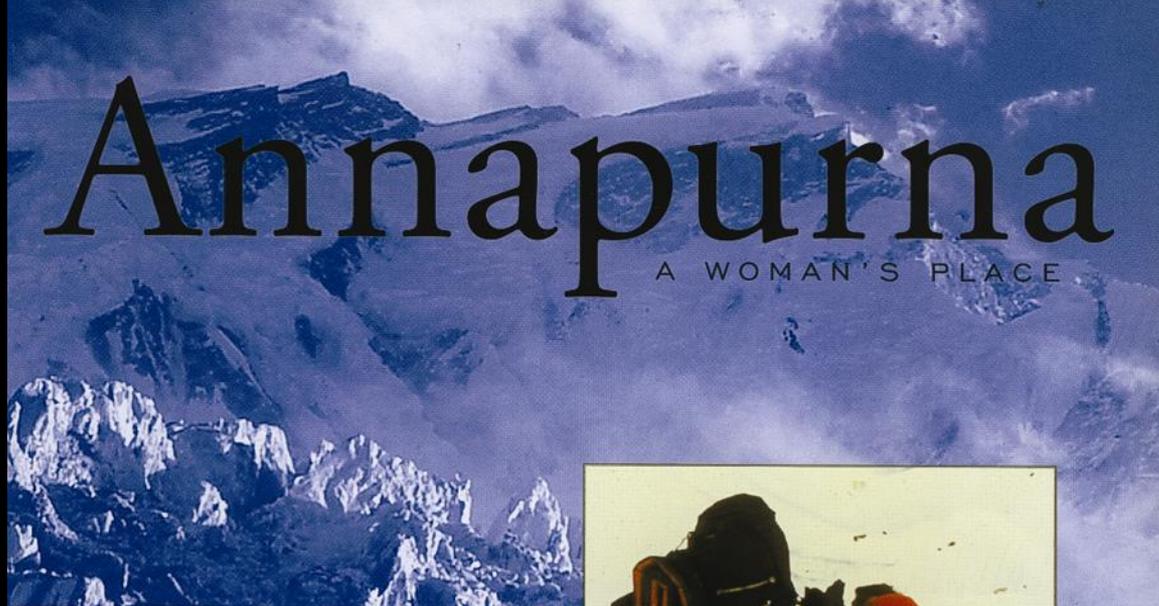
April , 1977

Chlorinated Tris replaced Brominated Tris

- Removed from pajamas in 1978
- Used in furniture until 2012

Annapurna

A WOMAN'S PLACE



The dramatic
story of the first
American ascent of
one of the world's
highest peaks



ARLENE BLUM

20TH ANNIVERSARY EDITION

With a new Preface and Afterword by the author

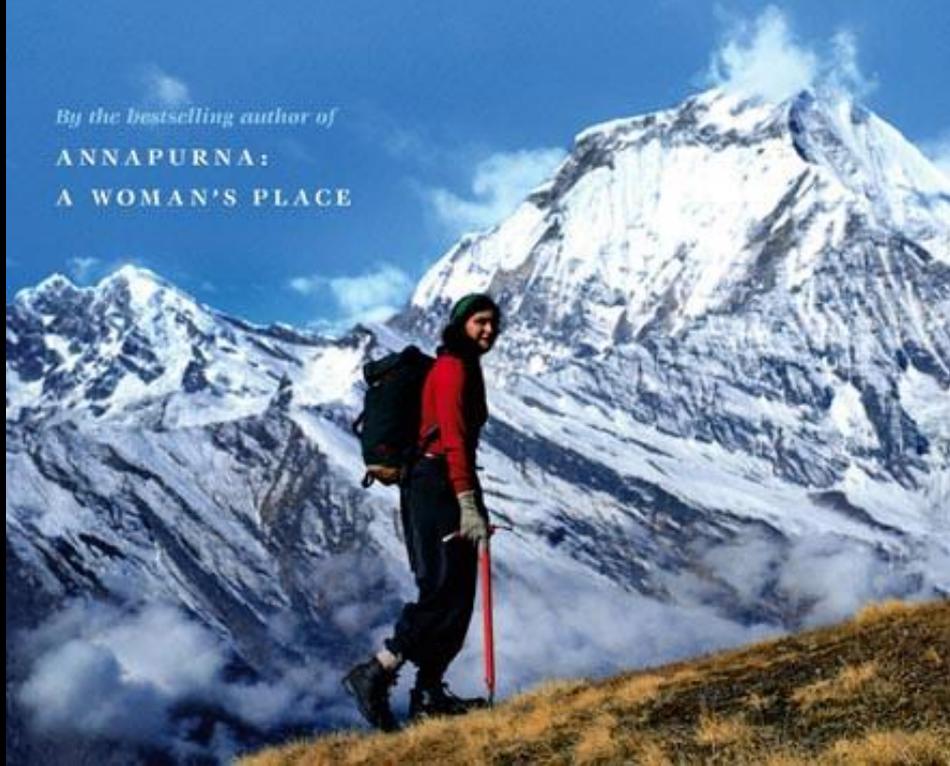
Arlene Blum

BREAKING TRAIL

A Climbing Life

By the bestselling author of

**ANNAPURNA:
A WOMAN'S PLACE**





GREEN SCIENCE POLICY INSTITUTE

Environmental Science & Technology

Building Insulation: New Codes

Novel and High Volume Use Flame Retardants in US Couches

Fluorinated High Volume Use Flame Retardants in US Couches

Fluorinated High Volume Use Flame Retardants in US Couches

Detection of Poly- and Perfluoroalkyl Substances (PFASs) in U.S. Drinking Water Linked to Industrial Sites, Military Fire Training Areas, and Wastewater Treatment Plants

Supporting Information

ABSTRACT: Drinking water contamination with poly- and perfluoroalkyl substances (PFASs) poses risks to the developmental, immune, metabolic, and endocrine health of consumers. We present a spatial analysis of 2013–2015 national drinking water PFAS concentrations from the U.S. Environmental Protection Agency's (U.S. EPA) third Unregulated Contaminant Monitoring Rule (UCMR3) program. The number of industrial sites that manufacture or use these compounds, the number of military fire training areas, and the number of wastewater treatment plants are all significant



Education



Retreats

Research

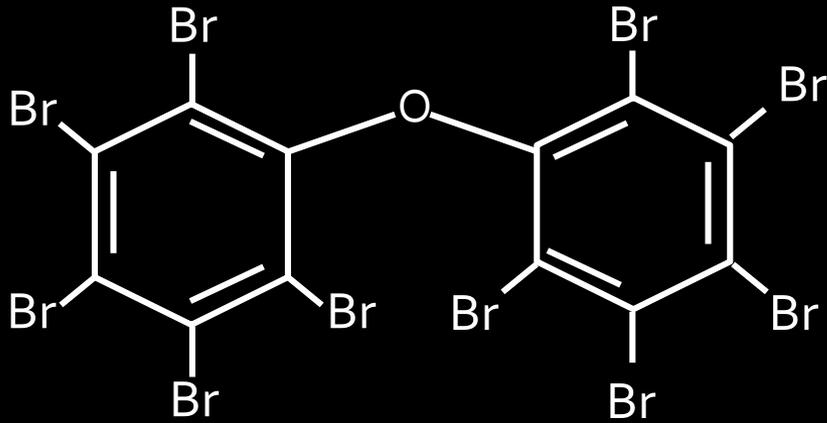
Policy & Purchasing Change

U.S. Toxic Substances Control Act (1976)

- 62,000 previous chemicals “grandfathered”
- 23,000 new chemicals
 - 85% have no health data
 - 67% have no data at all



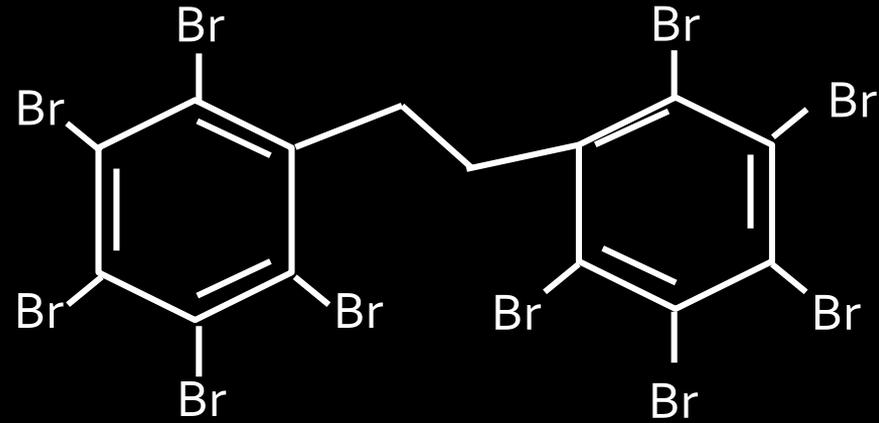
Regrettable Substitution



Decabromodiphenyl
ether

Concerns:

- Persistence
- Bioaccumulation
- Toxicity



Decabromodiphenyl
ethane

Concerns:

- Persistence
- Bioaccumulation
- Toxicity



**EVALUATING TENS OF THOUSANDS OF
INDIVIDUAL CHEMICALS IS UNWORKABLE**



BUT ADDRESSING **SIX GROUPS** OF
CHEMICALS OF CONCERN IS MANAGEABLE



Six Classes Videos

An innovative approach to reducing toxics

1

Highly
Fluorinated

2

Antimicrobials

3

Flame
Retardants

4

Bisphenols
+ Phthalates

5

Some
Solvents

6

Certain Metals



VIEW and SHARE: www.SixClasses.org

Healthier products, healthier people in four minutes!

Is it necessary?

Is it worth it?

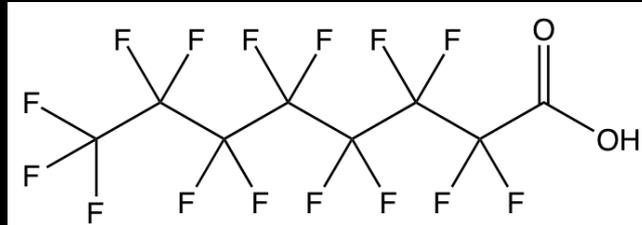
Is there a safer alternative?

Classes 1 to 3

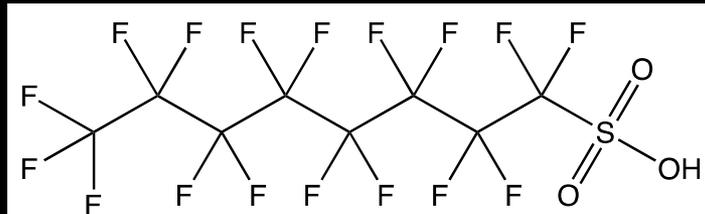
PFAS

(Per- and polyfluoroalkyl substances)

PFOA
(C8)



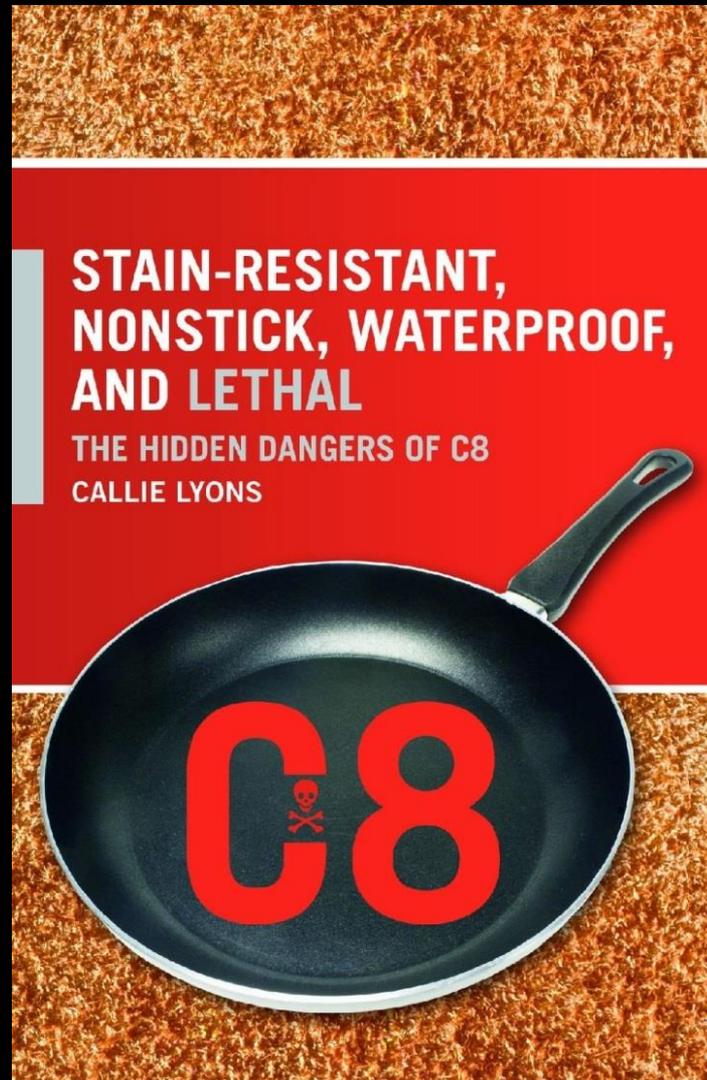
PFOS
(C8)



Carbon-Fluorine bond strength:

- Leads to oil and water repellency
- “Forever chemicals” -- last for geologic time!

Published 2007

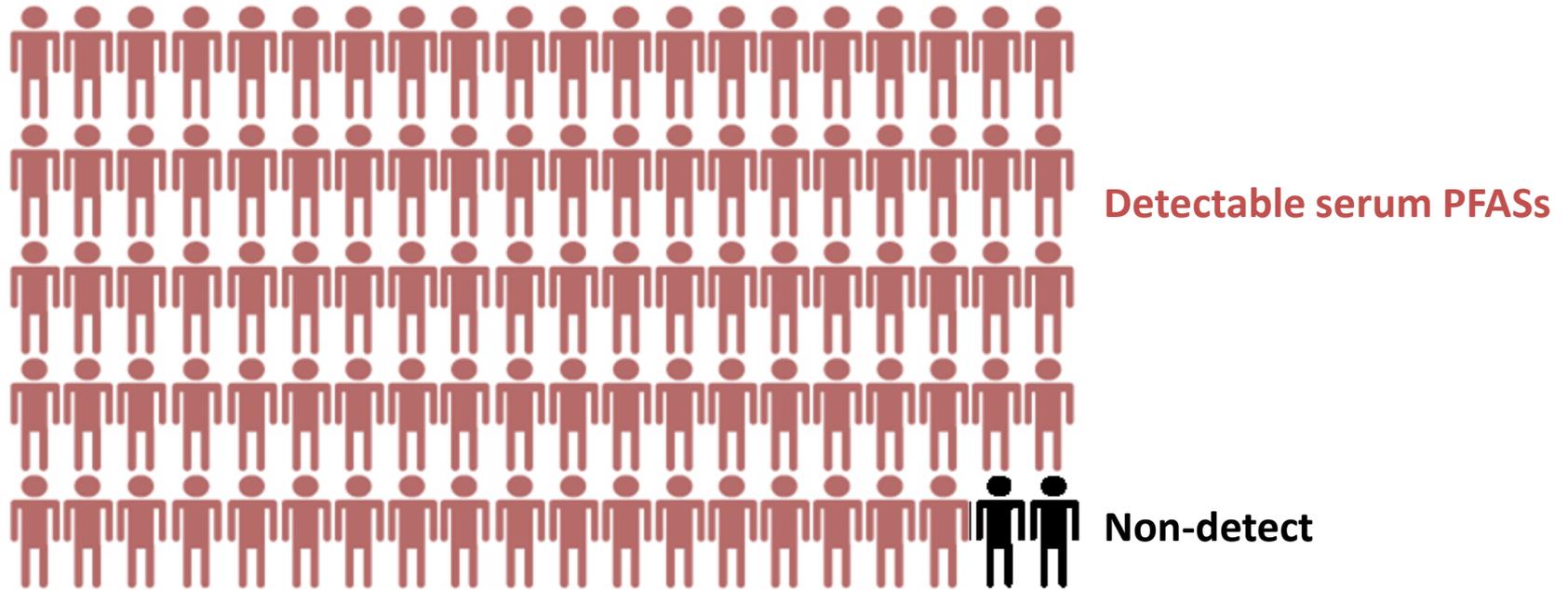


Ohio River Valley: West Virginia Manufacturing Plant

- PFOA used to manufacture Teflon
- Releases to water & air
- 70,000 + residents with contaminated drinking water
- C8 Health Study



PFAS exposure is a health concern



Exposure linked to health risks:

Cancer, elevated cholesterol, obesity, immune suppression, and endocrine disruption

Courtesy, Cindy Hu, Harvard University

(Ref: Lewis et al., 2015; Grandjean et al., 2012; Braun et al., 2016; Barry et al., 2013)

Common Uses



CARPETS



CARPET CLEANING PRODUCTS



FOOD PACKAGING



FURNISHINGS



COSMETICS



OUTDOOR GEAR



CLOTHING



ADHESIVES AND SEALANTS



PROTECTIVE COATINGS



NON-STICK COOKWARE

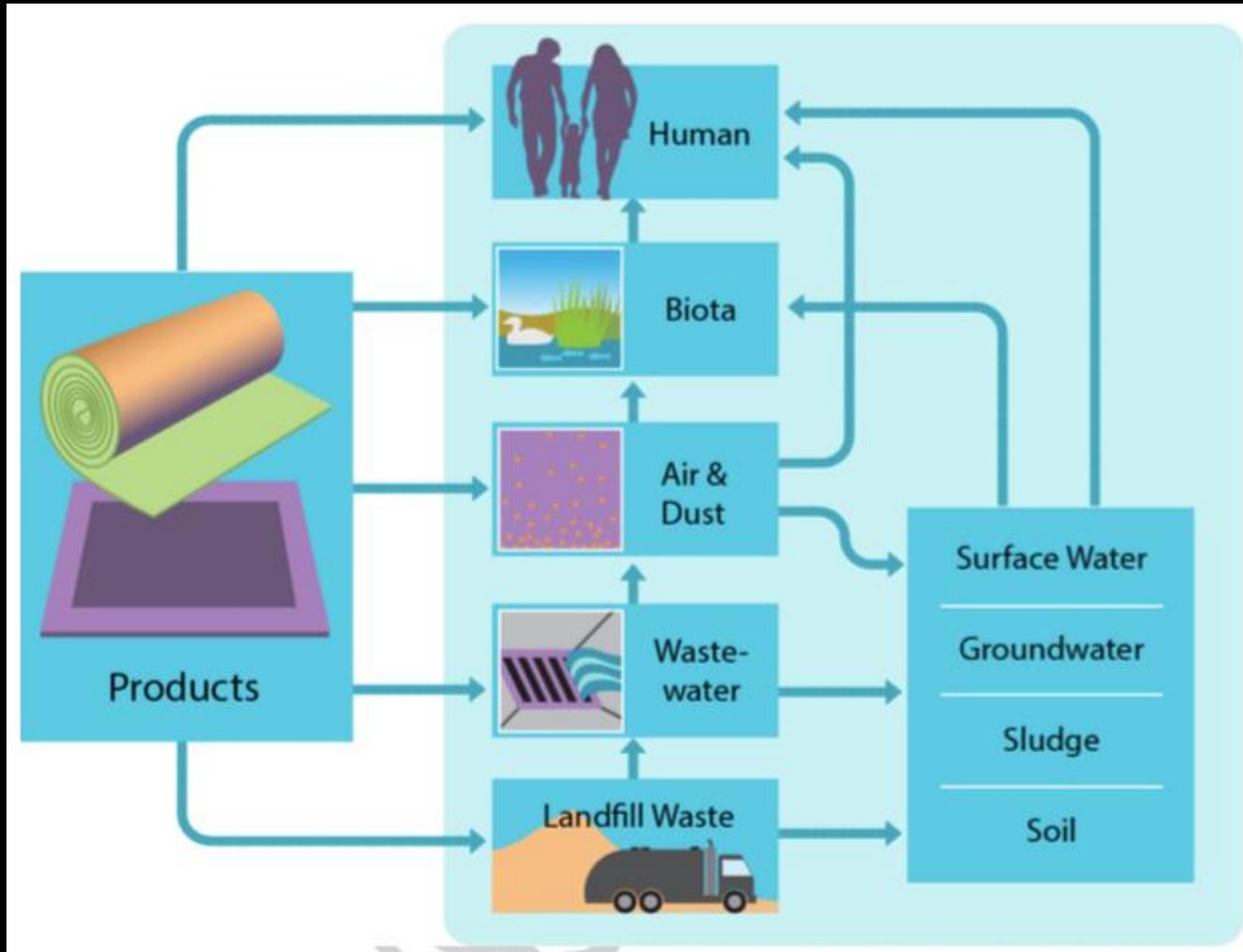


CARSEATS



FIREFIGHTING FOAM

Pathways to the Environment



PFAS and Carpet

- PFAS-treated carpet linked to high PFAS blood levels

ENVIRONMENTAL
Science & Technology

Article

pubs.acs.org/est

Exceptionally High Serum Concentrations of Perfluorohexanesulfonate in a Canadian Family are Linked to Home Carpet Treatment Applications

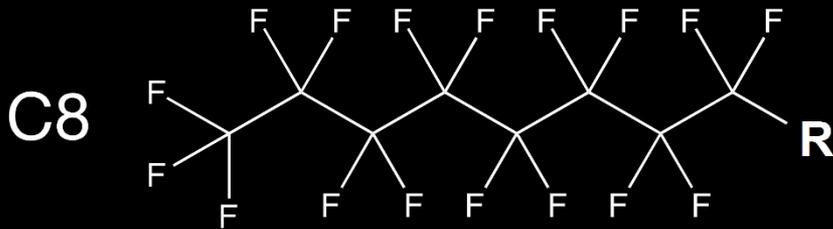
Sanjay Beesoon,[†] Stephen J. Genuis,[‡] Jonathan P. Benskin,^{†,§} and Jonathan W. Martin^{*,†}

[†]Division of Analytical and Environmental Toxicology, Department of Laboratory Medicine and Pathology, University of Alberta, Edmonton, AB, Canada

[‡]Department of Medicine, University of Alberta, Edmonton, AB, Canada

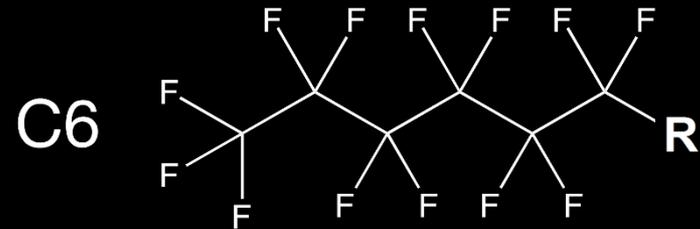
S Supporting Information

“Regrettable” Substitution?



Long chain phased out:

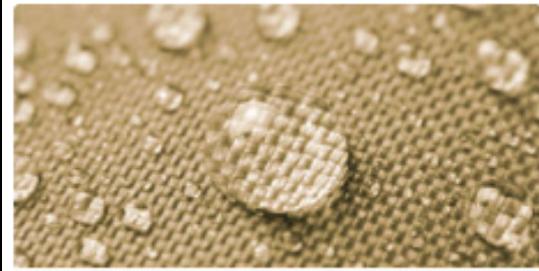
- Extreme persistence
- Bioaccumulation
- Toxicity



Short chain concerns:

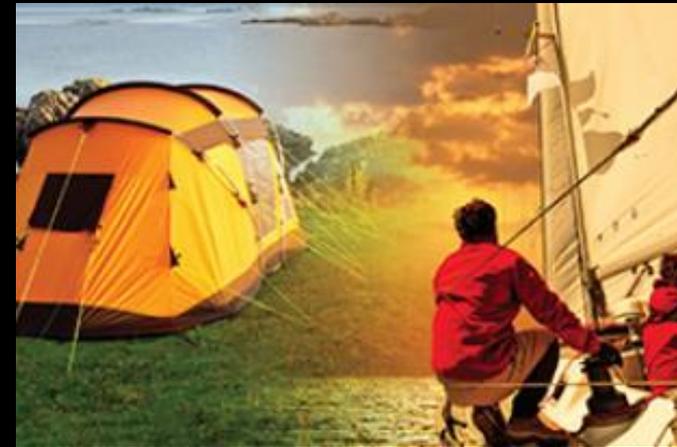
- Extreme persistence
- Build-up in plants
- Suspected toxicity
- More mobile
- Clean up more difficult

AGC – THE FIRST COMPANY TO FULLY CONVERT TO PFOA-FREE* WATER AND OIL REPELLENT



AsahiGuard® E Series is a fluorinated water and oil repellent providing sustainable alternatives for many applications, including paper packaging, textiles, apparel, non-wovens, natural and synthetic leathers and home furnishings based on proven AGC C6 chemistry. AsahiGuard E-Series offers high performance

C6 chemistry.



- “C6 polymers are proven safe for their intended use”
- “Evaluated by regulators, showing they are safe and effective”
- “C6 polymers cannot break down to C8”

May 2015 The Madrid Statement on Highly Fluorinated Chemicals



“We call on the international community to cooperate in limiting the production and use of PFASs and in developing safer non-fluorinated alternatives.”

Signed by 230 scientists from 40 countries

2015: Environmental Health Perspectives

2015-16

The Opinion Pages | OP-ED COLUMNIST

The New York Times

Chemicals in Your Popcorn?

JUNE 4, 2015



Nicholas Kristof

What do a pizza box, a polar bear and you have in common?

All carry a kind of industrial toxicant called poly- and perfluoroalkyl substances, or PFASs, that do two things: They make life convenient, and they also appear to increase the risk of cancer.

These Chemicals in Pizza Boxes and Carpeting Last Forever

More than 200 scientists around the world document the threats of perfluorinated compounds and call for more government control.

By Lindsey Konkel, National Geographic
PUBLISHED MAY 01, 2015



The Intercept

THE TEFLON TOXIN

DuPont and the Chemistry of Deception



Sharon Lezner

Aug. 11 2015, 3:35 p.m.



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Home

The New York Times Magazine

The Lawyer Who Became DuPont's Worst Nightmare

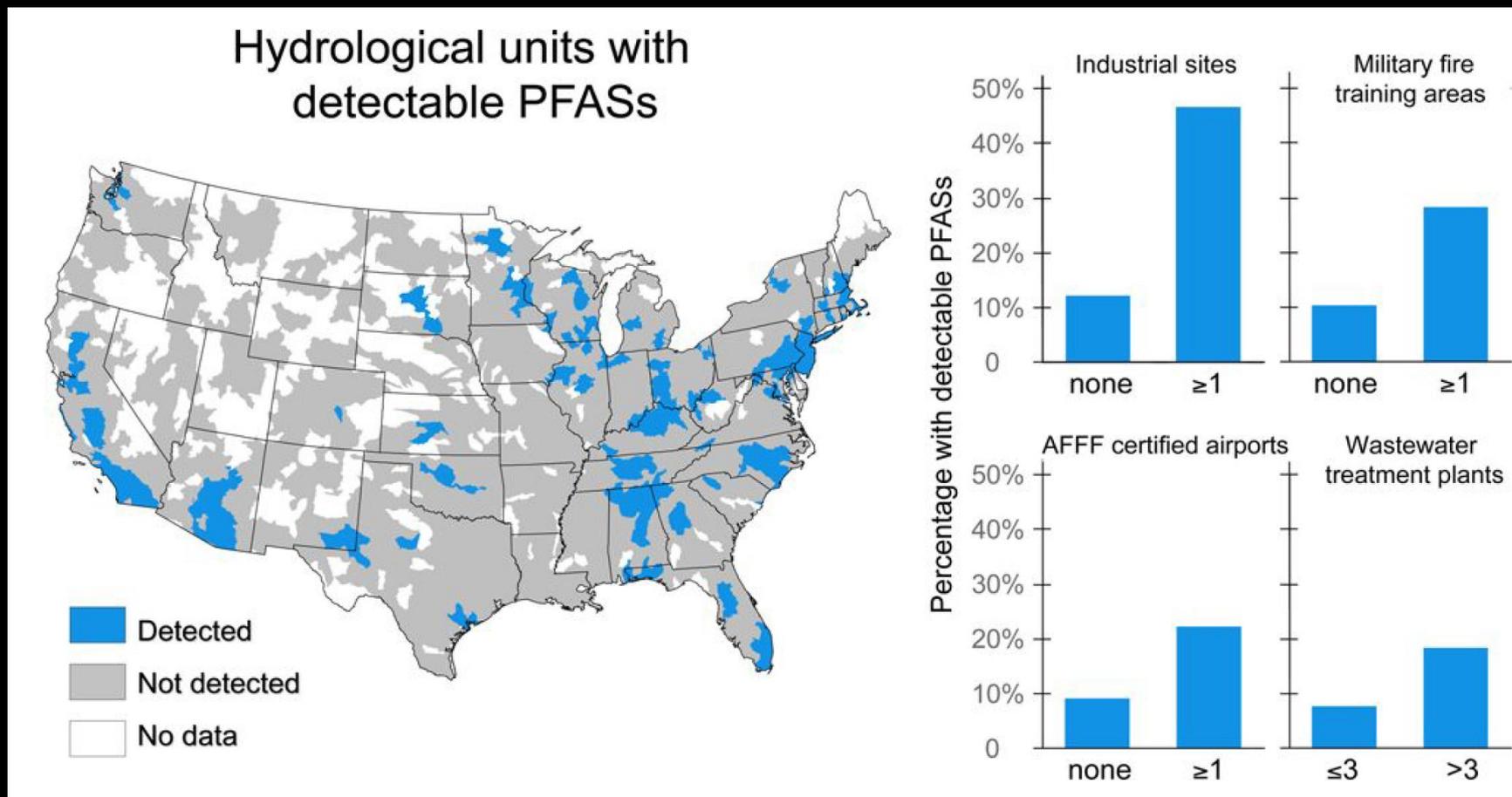
Rob Bilott was a corporate defense attorney for eight years. Then he took on an environmental suit that would upend his entire career — and expose a brazen, decades-long history of chemical pollution.

By NATHANIEL RICH JAN. 6, 2016



May 2016

EPA Lifetime Health Advisory Level of 70 ng/L PFOA + PFOS



Hu et al., Environ. Sci. Technol. Lett. 2016

Drinking Water Health Guidelines (parts per trillion)

DuPont PFOA: 5000

DuPont PFOA: 1000

U.S. EPA PFOA: 400
PFOS: 200

U.S. EPA PFOA & PFOS: 70

New Jersey PFOA: 14

New York PFOA: 10
PFOS: 10

1987

1991

2009

May 2016

Nov. 2017

July 2019

New data suggests PFOA limit as low as 0.1 ppt

- Linda Birnbaum, Director National Toxicology Program

- 700 x lower than EPA health advisory
- Based on rodent study linking PFOA to pancreatic cancer
- *"... I would not be surprised if the safe level of PFAS for humans is as low as 1.0-0.1 PPT."*

Michigan

- Wolverine treated leather with Scotchguard (PFOS)
 - Leather scrap dumped
 - Sludge applied to fields



- PFOA + PFOS level up to 58,000 ppt
842 times EPA health advisory level!

New Mexico

- Cannon Air Force Base

- Firefighting foam entered groundwater
- PFAS migrated from base to dairy wells to cows to milk



- Farmer: "I can't sell the milk. I can't sell beef. I can't sell the cows. I can't sell crops on my property."

- PFOS level up to 12,000 ppt
171 times EPA health advisory level!

Maine

- Biosolids spreading led to contamination of
 - Local municipal supply well
 - Milk at dairy
- Maine DEP:
 - All biosolids must now be tested for PFAS prior to use
 - Initial testing: nearly all biosolids exceed state screening levels for PFOS and/or PFOA (5.2 and 2.5 ng/g)



<https://theintercept.com/2019/06/07/pfas-chemicals-maine-sludge/>

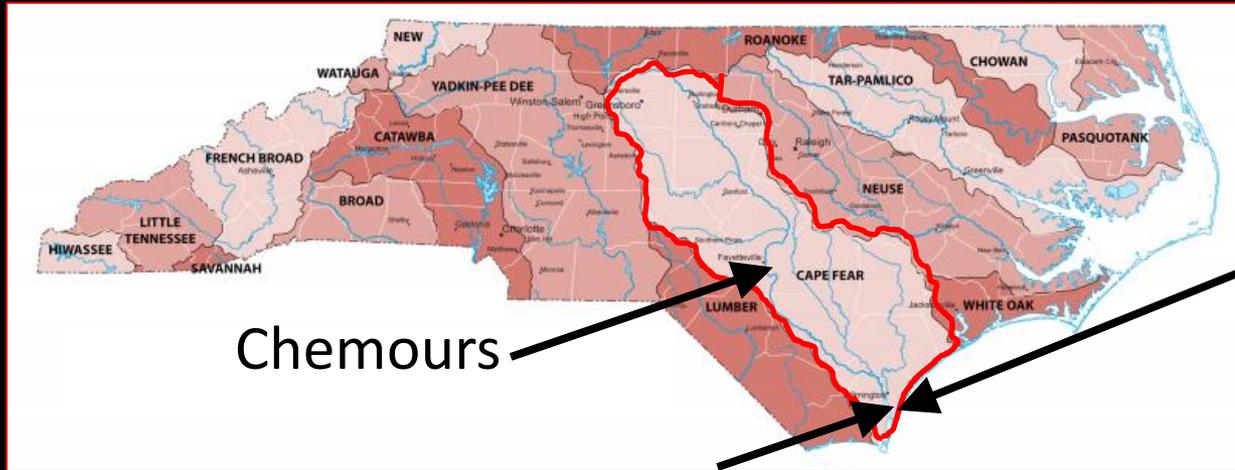
See also: Venkatesan and Halden, J. Hazard Mater., 2013

What to do with PFAS-contaminated soil?



- “Cannot be disposed of at a landfill, cannot be re-located, so the soil pile just sits there waiting for someone to come up with a treatment technology...very expensive.”

Water Treatment Costs: North Carolina



Chemours

Brunswick County:
reverse osmosis
filtration for 25,000
customers:

-\$99M to build

-\$2.9M to operate

Cape Fear Public Utility Authority activated
carbon filtration plant:

-\$46M to build

-\$2.7M to operate each year

Wilmington Star News,
May 9th and 10th, 2018

PFAS are Problematic
& Difficult to Clean Up

Prevention is Preferable!

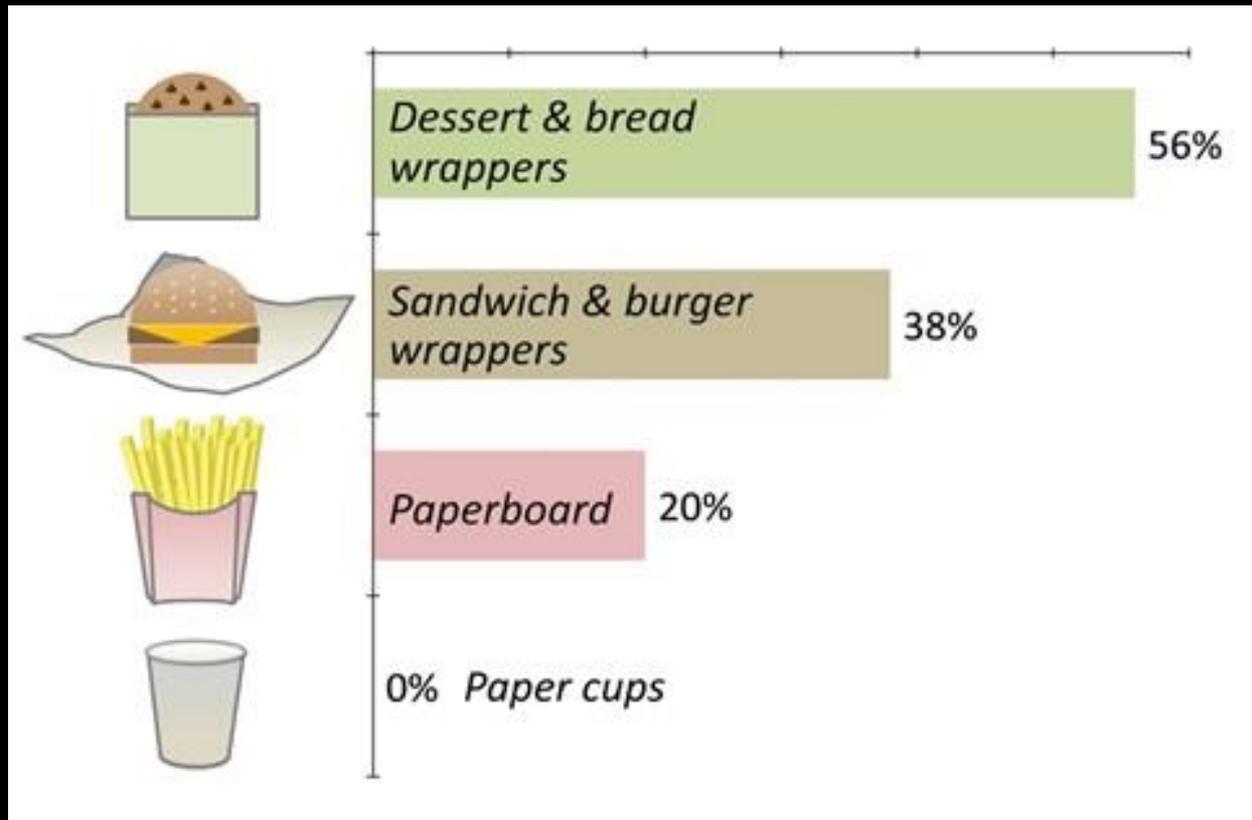
Recommendation:

Only use PFAS when essential.

Find safer alternatives if possible.

Fluorine in U.S. fast food packaging paper

(percent positive; 400 products sampled)



Adopted from Schaidler L. 2016 *Fluorinated compounds in U.S. fast food packaging*.

Should these products be considered compostable?

CNN @CNN Follow

Researchers found fluorinated chemicals in one-third of the fast food packaging they tested, according to a report cnn.it/2jWU6Rw



RETWEETS 237 LIKES 205

6:20 AM - 1 Feb 2017

47 237 205

Washington Post @washingtonpost Follow

Researchers find "another reason" to avoid fast food: Chemicals in the packaging



Researchers find 'another reason' to avoid fast food: Chemicals in the packa...
Substances with links to health problems have been found in wrappers and containers, where they can leach into food.
washingtonpost.com

RETWEETS 141 LIKES 106

Mother Jones @MotherJones Follow

The Nasty Ingredient in Fast-Food Wrappers
mojo.ly/2jCPzA4



RETWEETS 19 LIKES 22

5:09 AM - 1 Feb 2017

19 22

United States Senate
WASHINGTON, DC 20510

March 9, 2017

Mr. Daniel S. Schwartz
Chief Executive Officer
Restaurant Brands International Inc.
226 Wycroft Road,
Oakville, Ontario L6K 3X7,
Canada

Dear Mr. Schwartz:

We write to inquire about Burger King's use of potentially harmful fluorinated chemicals in food wrappers, bags, boxes, or other kinds of food packaging. Per and polyfluoroalkyl substances (PFASs) represent a class of chemicals sometimes used in fast food packaging to prevent grease and sauces from seeping through packaging. These chemical compounds have been

Microwave Popcorn Bags

- High PFAS concentrations ¹⁻⁴
- Coop Denmark - halted popcorn sales in 2015 due to PFAS
- RESULT: PFAS-free popcorn bags



1. Zabaleta, I., et al. *Talanta*. 152, 353-363. (2016)
2. Zafeiraki, E., et al. *Chemosphere*. 94, 169-176. (2014)
3. Dolman, S. and Pelzing, B. J. *Chrom. B.* 879:22, 2043-2050. (2011)
4. Begley, T. H., et al. *Food Add. and Cont.* 22:10, 1023-1031. (2005)

PFAS and Carpet

- CDC: “The greatest source of exposure to PFOA and PFOS for toddlers and children is hand-to-mouth activities from treated carpets.”

**DRAFT
TOXICOLOGICAL PROFILE FOR
PERFLUOROALKYLS**

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service
Agency for Toxic Substances and Disease Registry



<https://www.atsdr.cdc.gov/toxprofiles/tp200.pdf>

San Francisco City Carpet Regulation

(courtesy Jen Jackson)



NO
PFAS
Flame Retardants
Antimicrobials
(among other sustainability provisions)

BRANDS ARE ELIMINATING HIGHLY FLUORINATED CHEMICALS

IKEA

H&M

Crate&Barrel

LEVI STRAUSS & CO.

PUMA

benetton

ESPRIT

adidas

MARKS &
SPENCER

MANGO

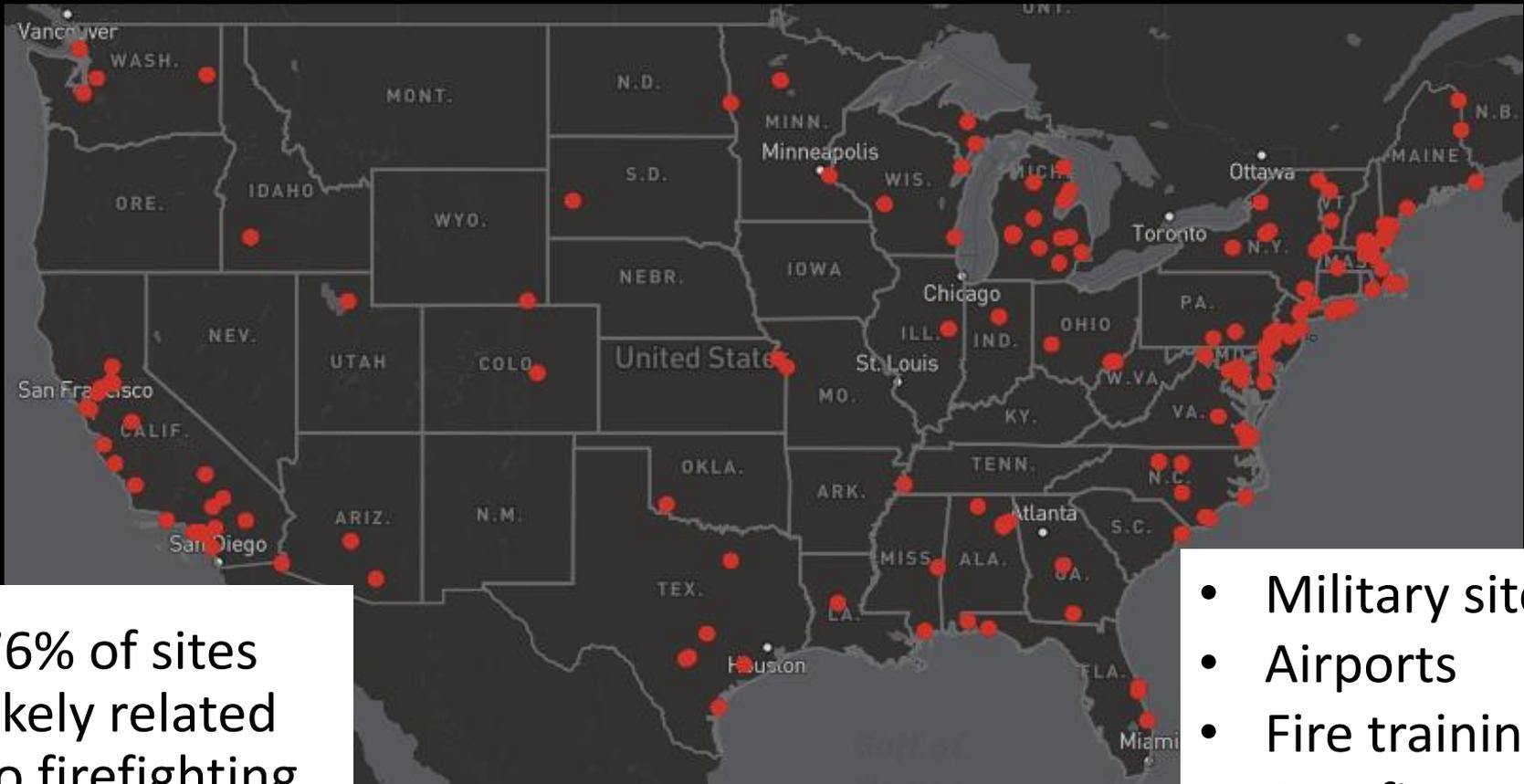
BURBERRY[®]
LONDON

ZARA

Moving away from PFAS



Firefighting foam (AFFF)



76% of sites likely related to firefighting foam use

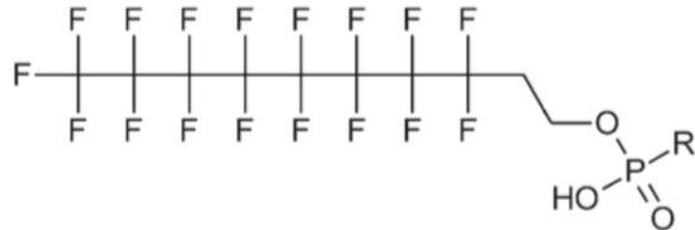
- Military sites
- Airports
- Fire training
- Past fires

Waste Water Treatment Plants

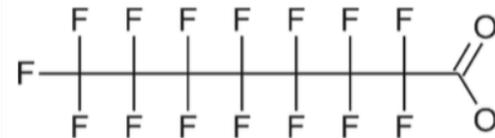
- Sources of PFAS loading
 - Industrial – electroplating, firefighting foam ...
 - Consumer – carpets, apparel, packaging, cosmetics...
 - Landfill leachate
- Conventional treatment trains ineffective for PFAS
 - Precursors break down during treatment so there can be more toxic PFAS in effluent than in influent!
- Long-chains partition to biosolids
- Short-chains partition to effluent

PFAA-precursors

- E.g., fluorotelomer phosphate esters (monoPAPs or diPAPs)
 - Used in paper products



Fluorotelomer phosphate esters
(ex. if R= OH then 8:2 monoPAP
if R= 8:2 FTO ester then 8:2 diPAP)



Perfluorocarboxylic acids
(ex. PFOA)

2020 Defense Bill (NDAA)



House

- DoD foam phase out
- USGS monitoring
- \$5M for health study
- Superfund listing
- Clean Water Act
- Many more...

Senate

- DoD foam phase out
- USGS monitoring
- \$10M for health study
- Drinking water standard for PFOA + PFOS in 2 y
- Toxics Release Inventory
- Firefighter blood testing



PFAS Central: sharing notable news, scientific papers & events



NEWS

PFAS Chemicals to be Banned in Firefighting Foam Used on Military Bases

U.S. Senator Kirsten Gillibrand today announced that a provision she cosponsored to prohibit the Department of Defense from procuring firefighting foam that contains per- and polyfluoroalkyl substances (PFAS) passed the Senate Armed Services Committee as part of the annual National Defense Authorization Act (NDAA).

[LEARN MORE](#)



SCIENCE

Larval amphibians rapidly bioaccumulate poly- and perfluoroalkyl substances.

Toxic frogs lead to bioaccumulation in predator species.

[LEARN MORE](#)



POLICY

The Cost of Inaction: A socioeconomic analysis of environmental and health impacts linked to exposure to PFAS

A recent Nordic Council study, The Cost of Inaction: A socioeconomic analysis of environmental and health impacts linked to exposure to PFAS, estimates the very high cost of harm to human health and the environment from PFAS exposure in Europe.

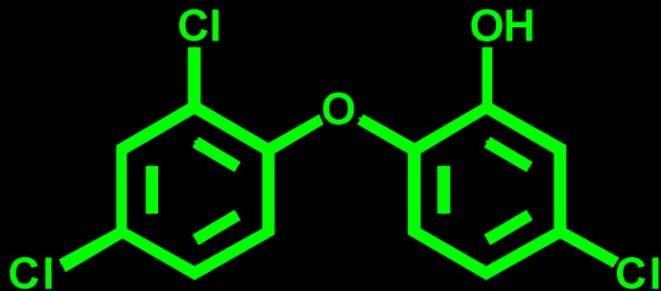
[LEARN MORE](#)

Although useful, PFAS or highly fluorinated chemicals are associated with serious health harm and can remain in the environment forever.

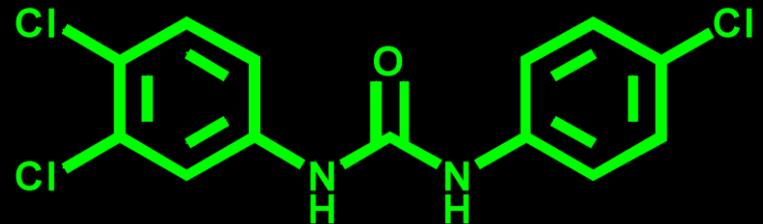
[LEARN MORE](#)

Class 2: Antimicrobials

Triclosan

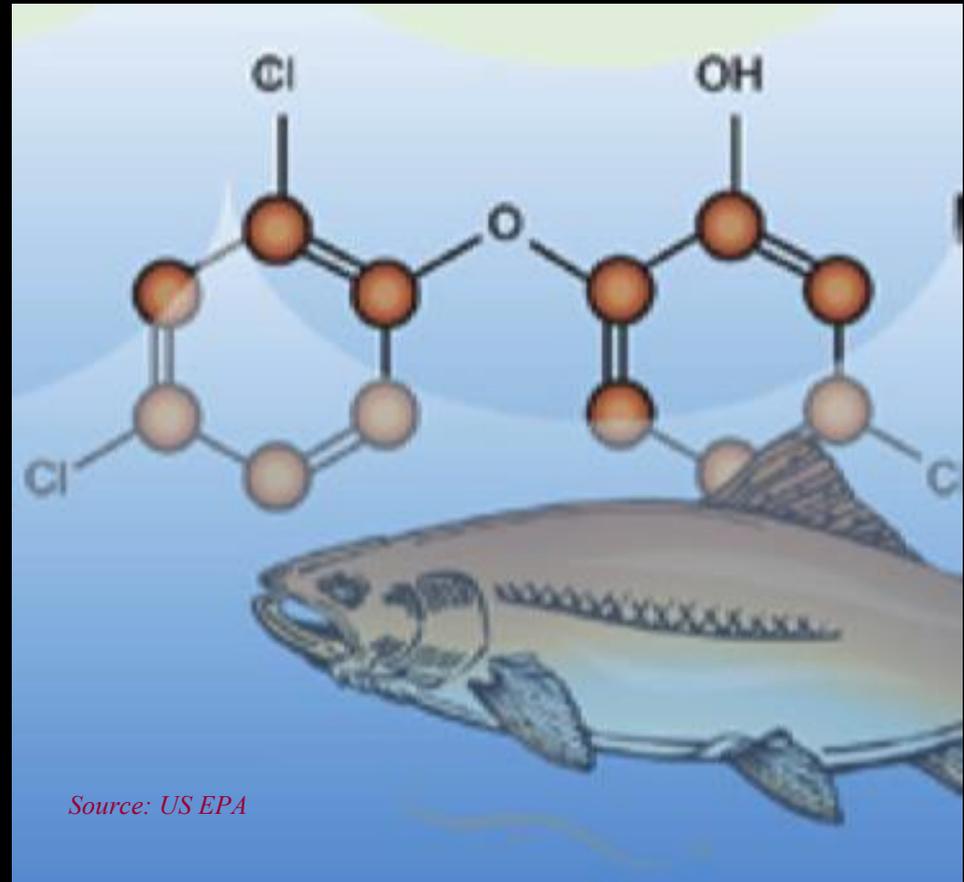


Triclocarban



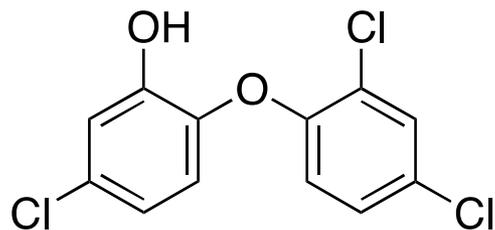
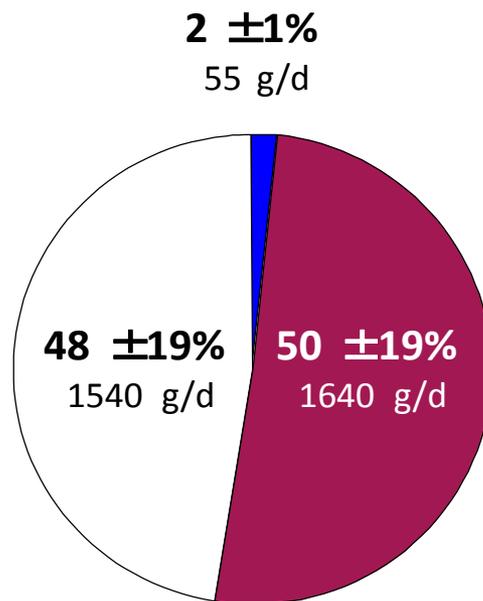


5 – 10 Seconds
(ineffective)



Lifetime exposure in
aquatic organisms
(toxic)

Fate of Triclosan in Activated Sludge WWTP

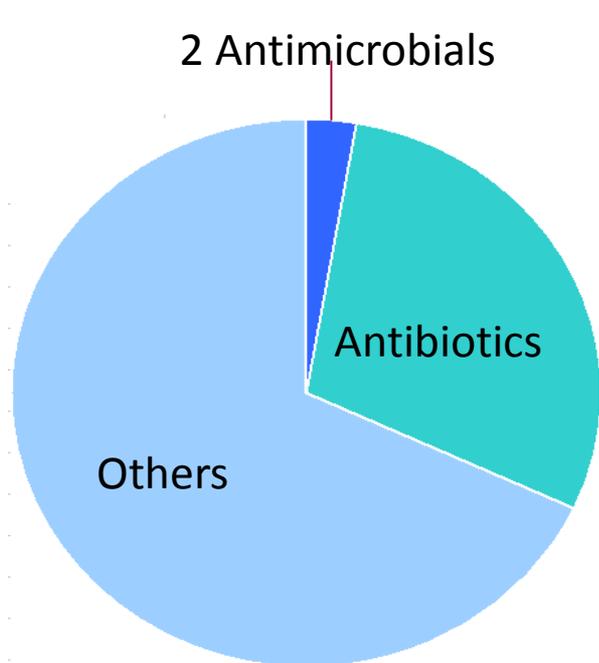


Triclosan (TCS)

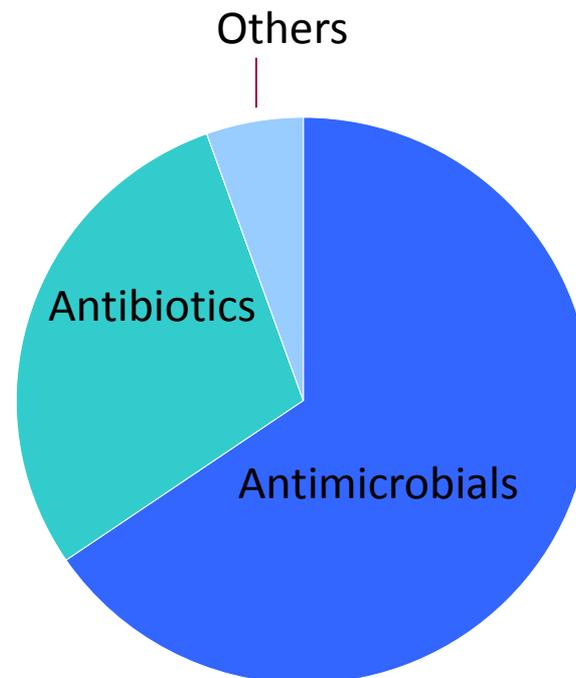
- Mass in effluent
- Mass in sludge
- Mass transformed/lost

Courtesy: Dr. Rolf Halden

Triclosan & Triclocarban: Key Sludge Pollutants



**72 pharmaceuticals & personal
care products studied**



Mass of Compounds

The Florence Statement on Triclosan and Triclocarban



Documents the scientific consensus about:

- potential for harm
- recommendations to prevent further harm

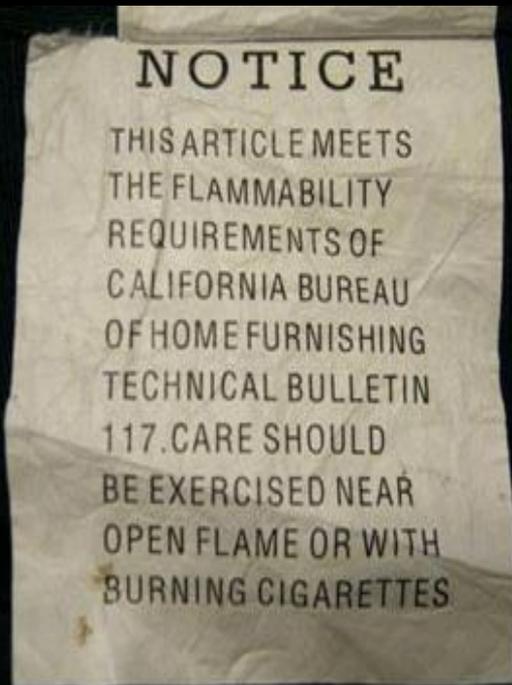
Signed by 205 international scientists

Class 3 Flame retardants

Updating 1970s Flammability Standards

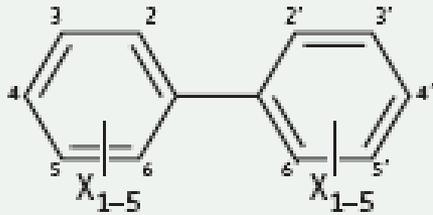
- Children's sleepwear --1976
- Furniture and baby product foam --2014
- Foam building insulation
- Electronics cases

Technical Bulletin 117

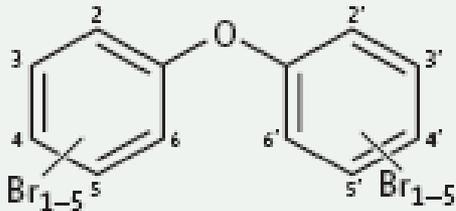


- Required furniture foam to withstand a small open flame for 12 seconds
- No significant fire safety benefit (fires start in exterior fabric not filling)

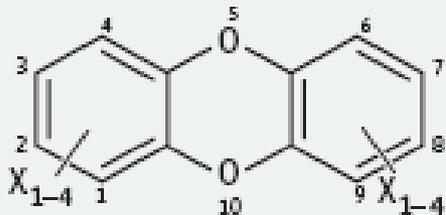
PentaBDE Flame Retardant



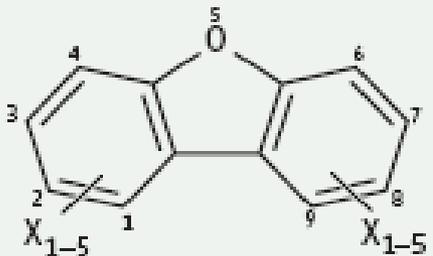
PCBs (X = Cl) and PBBs (X = Br)



PBDEs



Dioxins (X = Cl or Br)



Furans (X = Cl or Br)

Used from 1975 to 2004
to meet TB117.

98% of use in foam in US
and Canada in 2003

Flame retardants increase smoke toxicity more than they reduce fire growth

Flame retardants delay, but don't prevent ignition

Then, flame retardants can increase....



- Soot and Smoke
- Carbon Monoxide and Hydrogen Cyanide
- Dioxins and Furans

Furniture foam flame retardant (PentaBDE) associations with human health problems



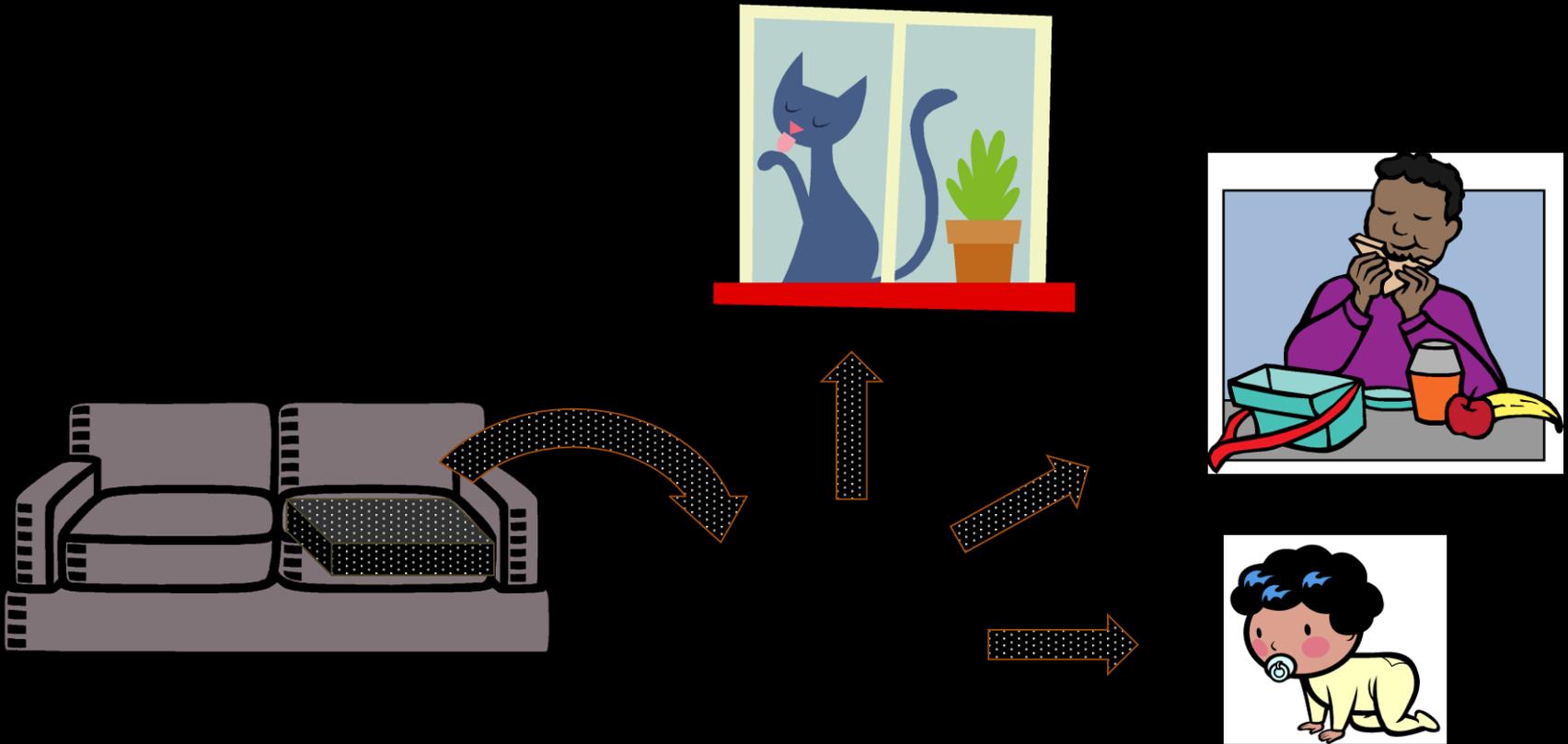
Increased time to pregnancy
Altered thyroid hormone
Thyroid disease in women



Impaired attention
Poorer coordination
Lower IQ
Developmental toxicity
Baby boys' genital problems
Lower birth weight
Delayed puberty in girls
Earlier puberty in boys

*Main et al. 2007; Goodyer et al 2017;
Eskenazi et al., 2010, 2011, 2012; Herbstman et
al. 2010; Makey et al. 2016; Windham et al.
2015; Harley et al. 2017; Allen et al. 2016*

From Products to People

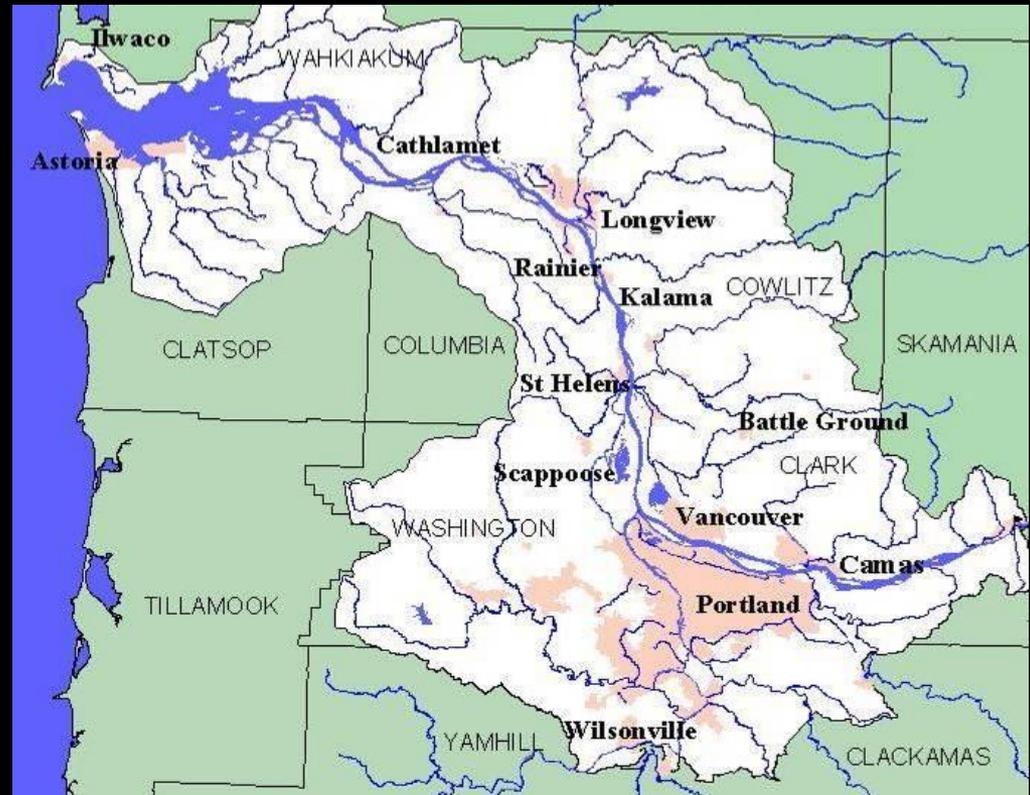


NOAA Finds PentaBDE in Sediments & Bivalves



PBDEs in the Lower Columbia & Willamette Rivers, February 25, 2010

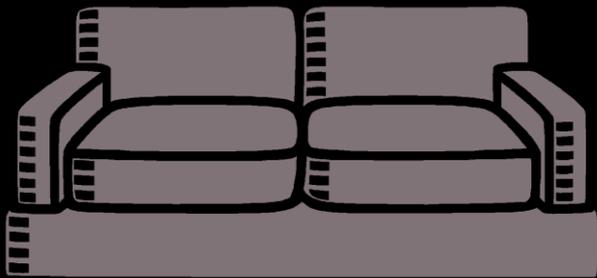
PBDEs in Salmon in the Columbia



Lyndal Johnson NOAA Fisheries
Northwest Fisheries Science Center Seattle, WA

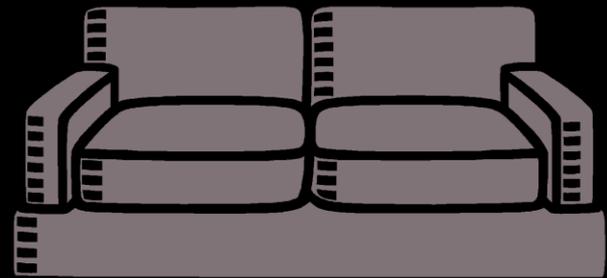
TB117 Fire Safety Benefit?

TB117 foam



~

Non - TB117 foam

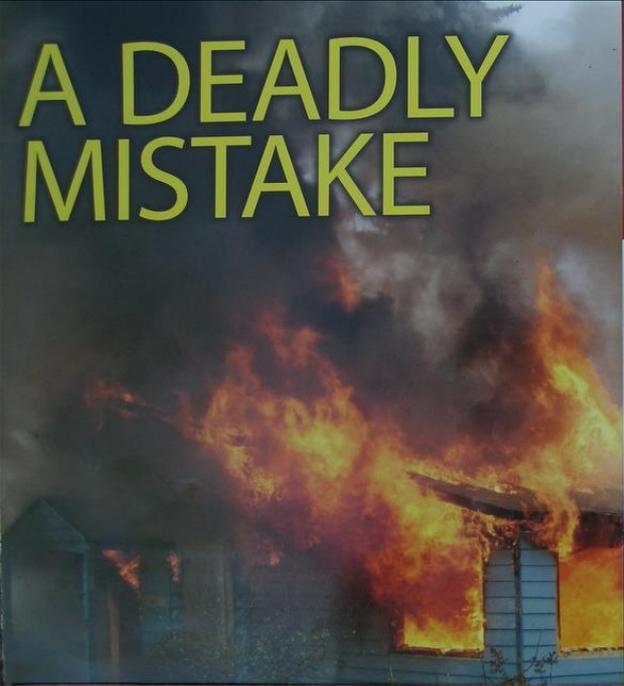


“No significant, consistent difference...”

Increased fire safety without flame retardants



Assembly Bill 706, Senate Bill 772, Senate Bill 1291, Senate Bill 147



A DEADLY MISTAKE

Help stop the bill that will ban material used to make flame resistant products.

CALL YOUR STATE SENATOR TODAY AND TELL THEM TO **VOTE NO ON AB 706**

Call State Senator **Tom Torlakson** at **916-651-4007** and tell him to **VOTE NO** on AB 706.



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Rancho Cordova, CA
Permit #275

P-15 P25 *****ECRLOT**C018

Richmond, CA 94804-5339

DON'T LET THE SACRAMENTO POLITICIANS BAN THE USE OF PROVEN FLAME RETARDANTS-IT COULD BE A DEADLY MISTAKE

Paid for by Californians for Fire Safety:

- Albemarle
- Chemtura
- Israel Chemicals LTD (ICL)



TRIBUNE WATCHDOG

Playing with fire

A deceptive campaign by industry brought toxic flame retardants into our homes and into our bodies. And the chemicals don't even work as promised.

BY PATRICIA CALLAHAN AND SAM ROE
Tribune reporters

Dr. David Heimbach knows how to tell a story. Before California lawmakers last year, the noted burn surgeon drew gasps from the crowd as he described a 7-week-old baby girl who was burned in a fire started by a candle while she lay on a pillow that lacked flame retardant chemicals.

"Now this is a tiny little person, no bigger than my Italian greyhound at home," said Heimbach, gesturing to approximate the baby's size. "Half of her body was severely burned. She ultimately died after about three weeks of pain and misery in the hospital."

Heimbach's passionate testimony about the baby's death made the long-term health concerns about flame retardants voiced by doctors, environmentalists and even firefighters sound abstract and petty.

But there was a problem with his testimony: It wasn't true. Records show there was no dangerous pillow or candle fire. The baby he described didn't exist.

Neither did the 9-week-old patient who Heimbach told California legislators died in a candle fire in 2009. Nor did the 6-week-old patient who he told Alaska lawmakers was fatally burned in her crib in 2010.

Heimbach is not just a prominent burn doctor. He is a star witness for the manufacturers of flame retardants.

His testimony, the Tribune found, is part of a decades-long campaign of deception that has loaded the furniture and electronics in American homes with pounds of toxic chemicals linked to cancer, neurological deficits, developmental problems and impaired fertility.

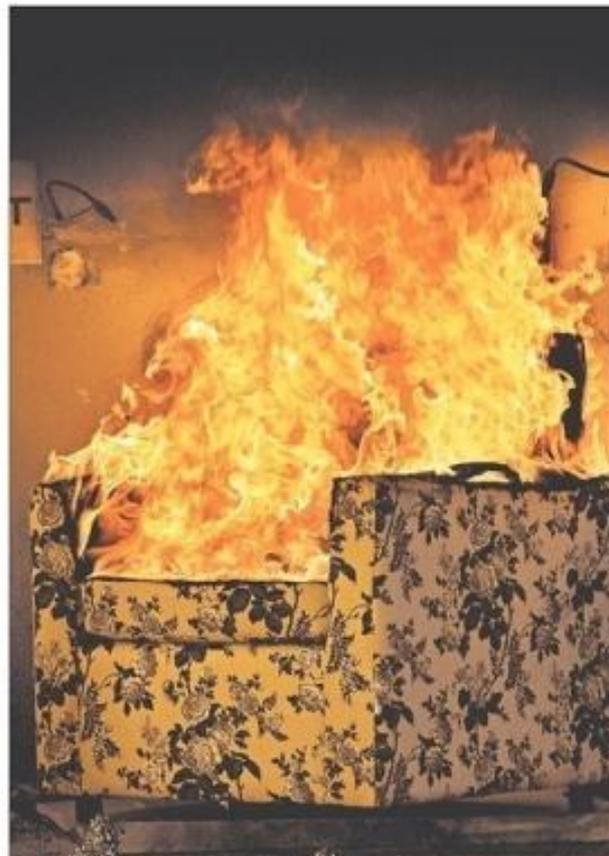
The tactics started with Big Tobacco, which wanted to shift focus away from cigarettes as the cause of fire deaths, and continued as chemical companies worked to preserve a lucrative market for their products, according to a Tribune review of thousands of government, scientific and internal industry

stoked the public's fear of fire and helped organize and steer an association of top fire officials that spent more than a decade campaigning for their cause.

Today, scientists know that some flame retardants escape from household products and settle in dust. That's why toddlers, who play on the floor and put things in their mouths, generally have far higher levels of these chemicals in their bodies than their parents.

Blood levels of certain widely used flame retardants doubled in adults every two to five years between 1970 and 2004. More recent studies show levels haven't declined in the U.S. even though some of the chemicals have been pulled from the market. A typical American baby is born with the highest recorded concentrations of flame retardants among infants in the world.

People might be willing to accept the health risks if the



Pulitzer Prize

Finalist

Goldsmith Prize

Investigative Reporting

Environmental

Journalists Society

Environmental Reporting

Gerald Loeb Award

Business and Financial Journalism

National Press Club

Consumer Award

California TB117-2013

REQUIREMENTS FOR CALIFORNIA BUREAU OF FIRE PREVENTION, HOME APPLIANCES AND ELECTRICAL DIVISION, TECHNICAL BULLETIN 117-2013. CARE SHOULD BE EXERCISED NEAR OPEN FLAME OR WITH BURNING CIGARETTES.

THE UPHOLSTERY MATERIALS IN THIS PRODUCT:

CONTAIN ADDED FLAME RETARDANT CHEMICALS

CONTAIN NO ADDED FLAME RETARDANT CHEMICALS

THE STATE OF CALIFORNIA HAS UPDATED THE FLAMMABILITY STANDARD AND DETERMINED THAT THE FIRE SAFETY REQUIREMENTS FOR THIS PRODUCT CAN BE MET WITHOUT ADDING FLAME RETARDANT CHEMICALS. THE STATE HAS IDENTIFIED MANY FLAME RETARDANT CHEMICALS AS BEING KNOWN TO, OR STRONGLY SUSPECTED OF, ADVERSELY IMPACTING HUMAN HEALTH OR DEVELOPMENT.

City of San Francisco Upholstered Furniture & Children's Products

NO
Flame Retardants



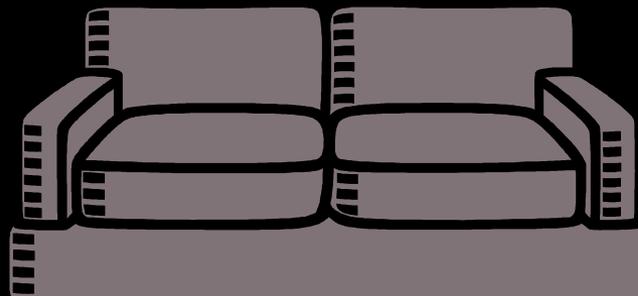
(courtesy Jen Jackson)

California Bans Flame Retardants in furniture, children's products & mattress foam

Signed September 30, 2018

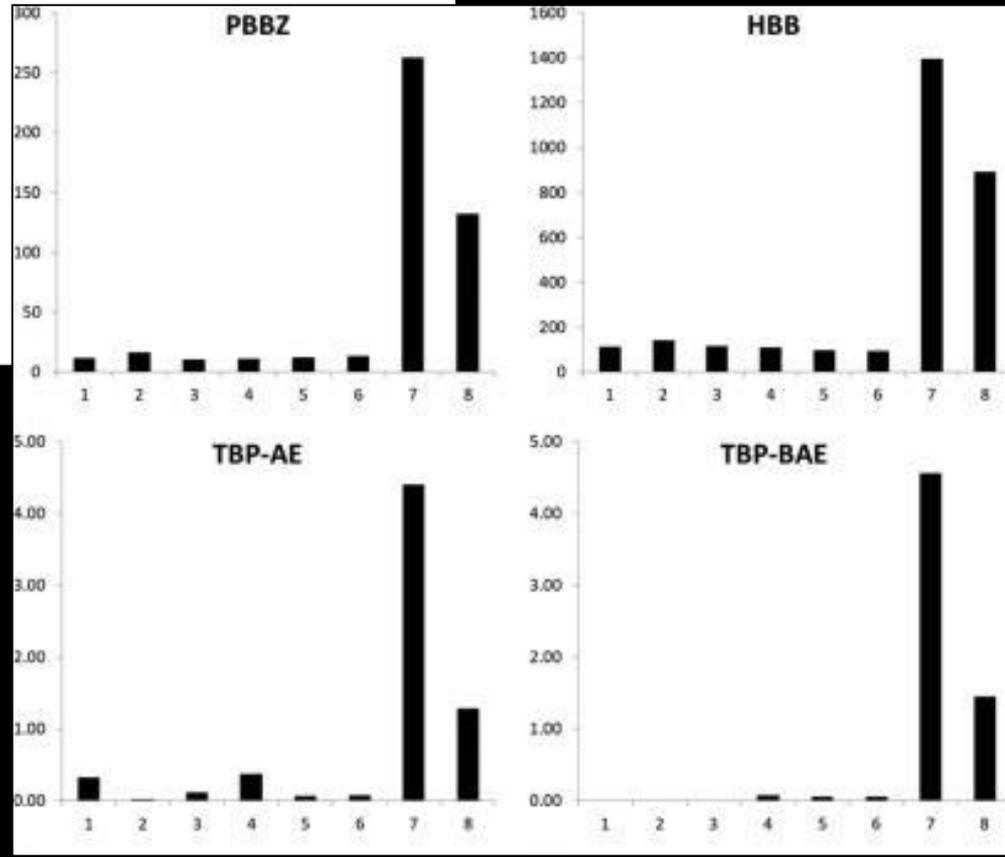
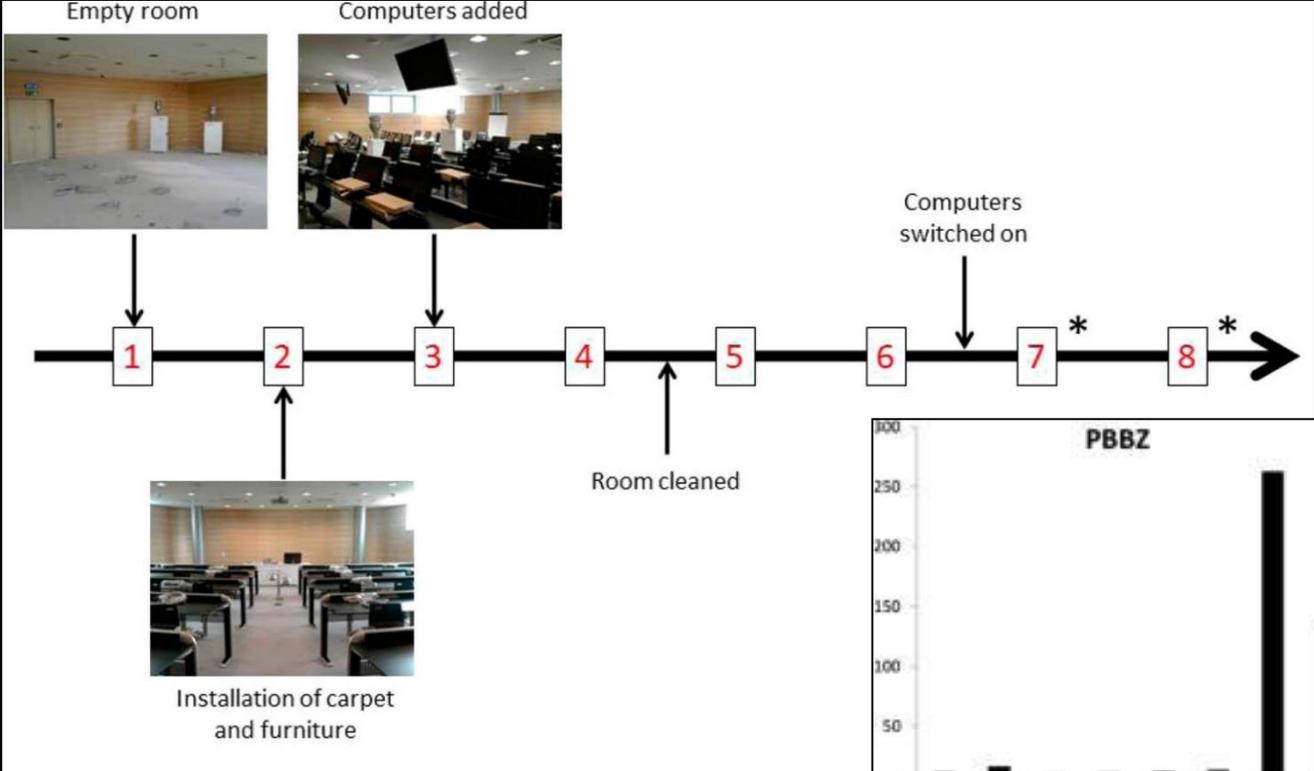
“Toxic flame retardant chemicals have put consumers, children, and firefighters at risk for decades. Today we say no more.”

-AB 2998, Sponsor: Assemblyman Bloom



Flame Retardants in Electronics

Increased FRs from Electronics in Use



Study of flame retardants in air of a newly built classroom at 8 timepoints

Vojta *et al*, "Changes in Flame Retardant and Legacy Contaminant Concentrations in Indoor Air during Building Construction, Furnishing, and Use," 2017 DOI: 10.1021/acs.est.7b03245

Recycling Flame Retarded Plastics

Flame Retardants in Kitchen Utensils

- Black plastic often contains BFRs
- BFRs found in 34% of tested utensils
- Up to 20% of BFRs transferred to hot cooking oil



PETITION: U.S. Consumer Product Safety Commission

Declare as “banned hazardous substances”:

- Children’s products
- Residential furniture
- Mattresses & mattress pads
- Plastic electronics enclosures



with the **class** of non-polymeric organohalogen FRs added

GRANTED –2017

National Academy of Science Scoping Report, 2019:

“The only possible practical approach for a set of chemicals as large as the OFRs is a class approach.”

EU Ban on Flame Retardants in Electronics Cases

- Ecodesign directive bans all organohalogen flame retardants
 - For cases and stands of electronic displays and TVs
 - Unanimously approved by 24 member states on December 19, 2018
 - Starting in 2021
 - Justification is need for plastic recycling in the Circular Economy

4. Halogenated flame retardants

The use of halogenated flame retardants is not allowed in the enclosure and stand of electronic displays.

Brussels, XXX
D059740/02
[...] (2019) XXX draft

COMMISSION REGULATION (EU) .../...

of XXX

laying down codesign requirements for electronic displays pursuant to Directive 2009/125/EC of the European Parliament and of the Council, amending Commission Regulation (EC) No 1275/2008

Flame Retardants in Building Insulation

Do we Need Flame retardants in Building Insulation?

- Behind a thermal barrier?
- Beneath a concrete foundation?

Building codes can be safety updated to allow the use of flame retardant free polystyrene insulation below slab.

-California State Fire Marshal study

Jan. 2019: California code revision allows flame retardant-free insulation below a slab



Nov. 2019: ICC Members- Please vote to approve RB131

Fall 2020: Oregon Building Codes Division updates Residential Specialty Code

To support healthier Oregon building codes, speak with Arlene or email joe@GreenSciencePolicy.org

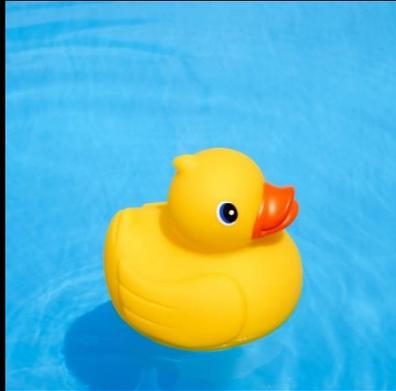
Class Four:

Bisphenols



FUNCTIONS: hardening agents, strengtheners, stabilizers

Phthalates



FUNCTIONS: plasticizers, lubricants, solvents, fragrances

Class 5:

Some Solvents



FUNCTIONS: dissolving and dispersing other substances

Class 6: Certain Metals

Mercury



Arsenic



Cadmium



Lead



FUNCTIONS: conductors, malleable, resistant to corrosion

Six Classes Videos

An innovative approach to reducing toxics

1

Highly
Fluorinated

2

Antimicrobials

3

Flame
Retardants

4

Bisphenols
+ Phthalates

5

Some
Solvents

6

Certain Metals



VIEW and SHARE: www.SixClasses.org

Healthier products, healthier people in four minutes!

California Hall of Fame



Robert Redford, Fernando Valenzuela, Ann Gust Brown, Jerry Brown, Arlene Blum, Thomas Keller, Ed Lee's daughter, Belva Davis, & Joan Baez.



For monthly e-newsletters,
give Arlene your card or
sign our mailing list

**This talk will be
under Past Events at
www.GreenSciencePolicy.org**



GREEN SCIENCE
POLICY INSTITUTE

Workshop
Tackling Toxics:
The Class Concept for Healthier Water

4:00 pm

July 25, 2019

By limiting use of the Six Classes

A scenic landscape photograph featuring a large, snow-capped mountain peak in the background. The foreground is a lush, green hillside with various wildflowers, including prominent red ones. A dirt path winds through the grass. In the middle ground, there are rolling hills covered in dense evergreen forests, with a layer of white clouds or fog filling the valley between them. The sky is clear and blue.

We can have a healthier world.

**For more information:
GreenSciencePolicy.org**



GREEN SCIENCE
POLICY INSTITUTE

Workshop Tackling Toxics: The Class Concept for Healthier Water

4:00 pm

July 25, 2019

Introductions

- Name
- Your position and where you work
- What brought you here?

Groups

- 1. Pre-treatment
- 2. Education & Outreach
- 3. Biosolids
- 4. Stormwater
- 5. Other public health and government

Group Instructions

- Group of four or five with time keeper
- Pick one class and one product. How can you use the class concept for healthier water?
- Think about ideas and write **5 minutes**
- Report back **ACTIVE LISTENING** **3 minutes**
- Choose 2 ideas for discussion **5-10 minutes**
- Flipchart
- Group report back and discussion

Commitments

Name

Partners

To help create the future I envision,
during the next month I will:

1.

2.

3.