PFAS in California
Core Scientific Principles and Policy Recommendations

State Water Resources Control Board
Informational Hearing on PFAS
March 6, 2019

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Need for Strict Health Protections

Lessons learned from existing toxicity assessments.
PFAS as a Class

- Fluoropolymers (e.g., Teflon)
- PFPEs
- PFAAs (fully fluorinated/partially fluorinated)
- PFAA precursors (partially fluorinated/polyfluorinated)
- PFCAs (e.g., PFOA, PFNA)
- PFSAs (e.g., PFOS, PFHxS)
- PFECAs & PFESAs (e.g., GenX, ADONA)
- Fluorotelomer-based substances (e.g., 8:2 FTOH)
- PASF-based substances (e.g., NETFOSAA, PAPs)

### Health Effects Linked to PFAA Exposure

Summary of ATSDR’s Findings on Health Effects from Perfluoroalkyl Acid Exposure

<table>
<thead>
<tr>
<th></th>
<th>Immune</th>
<th>Developmental &amp; Reproductive</th>
<th>Lipids</th>
<th>Liver</th>
<th>Endocrine</th>
<th>Body Weight</th>
<th>Blood</th>
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Additive and/or synergistic effects likely
Short-chain PFAS Health Concerns

- Introduced as ‘safer’ alternatives due to their supposed shorter half-lives in humans
  - Found to accumulate in organs, some at concentrations that are higher than long-chain PFAS\(^1\)
  - Highly persistent, more mobile in the environment and harder to treat than long-chain PFAS\(^2\)
  - Continual exposure - elimination rate may be an inadequate measure of health threat to humans\(^3,4\)

EPA’s 70 ppt is Not Health Protective
EPA’s 70 ppt is Not Health Protective

- Michigan PFAS Science Advisory Panel estimated blood serum levels from exposure to 70 ppt PFOA in drinking water\(^1\)
  - Results in blood serum levels at which health effects are seen in epidemiology studies (including C8 study)
- Risk assessment analysis:
  - Protective of infants: lowers threshold to 20 ppt
  - Based on most sensitive health effect: below 1 ppt

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Possible Extent of PFAS Contamination in California

Lessons learned from Michigan
National UCMR3 vs. Michigan Testing

3 detects in 2 zip codes

40+ contamination sites
100+ public water systems

https://www.michigan.gov/pfasresponse/0,9038,7-365-86511---,00.html
https://www.michigan.gov/pfasresponse/0,9038,7-365-86510_87918-464299--,00.html
CA PFAS Contamination - UCMR3

- 133 samples above MRL
- 28 PWS, 98 zip codes affected
- ~3.5 million people

Potential PFAS Contamination in CA


Conclusions

1. PFAS are a serious public health threat
2. Health risks at extremely low level exposures
3. Likely additive/synergistic effects
4. A class-based approach is needed
5. Potential for significant PFAS contamination in CA
Policy Recommendations

Steps to addressing PFAS in California water.
What We Know

<table>
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<th>Chemical</th>
<th>National</th>
<th>California</th>
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<tbody>
<tr>
<td></td>
<td>PWSs with results ≥ MRL (4,920 PWS total)</td>
<td>Percent</td>
</tr>
<tr>
<td>PFOA</td>
<td>95</td>
<td>1.9%</td>
</tr>
<tr>
<td>PFOS</td>
<td>117</td>
<td>2.4%</td>
</tr>
<tr>
<td>PFNA</td>
<td>15</td>
<td>0.3%</td>
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<td>PFHxS</td>
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<td>1.7%</td>
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<td>PFBS</td>
<td>8</td>
<td>0.2%</td>
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</table>
Consensus for Concern

As scientists and other professionals from a variety of disciplines, we are concerned about the production and release into the environment of an increasing number of poly- and perfluoroalkyl substances (PFASs) for the following reasons:

1. PFASs are man-made and found everywhere. PFASs are highly

   d. Increasing use of fluorochemical 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.

Helsingør Statement on poly- and perfluorinated alkyl substances (PFASs)

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What We Don’t Know Can Hurt Us

• What additional PFAS are contaminating our environment?
• What PFAS are currently produced and released?
• Sources of contamination in CA?
• Impact of being exposed to a unknown mixture of PFAS?
• Contribution of drinking water to total human exposure?
Aqueous Film Forming Foam

- 19 California military sites with PFOA/PFOS above 70 ppt
  
  Range = 70 to 8,000,000 ng/L

- No data on 57 subgroups of PFAS found in AFFF or AFFF-impacted groundwater

- 97.6% airports conduct foam tests 1-3 times/yr.

- 78.9% airports discharge foam onto the ground.


Other Sources

Wastewater and Recycled water

PFOA, PFOS, PGHxS, PFDS, PFHxA, PFHpA, PFNA, PFDA, 6:2 FtS, FOSA, N-EtFOSAA.*

Metal plating and other industrial sites
Packaging waste
Carpet/textile waste
Personal care products

California Needs to Act
What California Needs

• Clearer understanding of PFAS environmental contamination, requiring a class approach

• Strategies to stop further PFAS contamination of water sources and other environmental media

• Regulations to address current environmental contamination

• A comprehensive, multiagency approach to addressing PFAS

https://stablekernel.com/the-iceberg-understanding-the-depth-of-your-mobile-software-partner/
Recommendation 1

Approach PFAS as a class
Recommendation 2

Require monitoring of all PFAS for which there are validated testing methods.

- EPA Method 537 v1.1 = 18 PFAS chemicals
- Total Oxidizer Precursor (TOP) Assay – possible surrogate for total PFAS in drinking water.
Recommendation 3

Request class-based Public Health Goal

Precedents include PCBs, Dioxins, Disinfection By-products
Recommendation 4

Multi-agency/stakeholder task force
Include Public Interest Groups

1. AFFF restrictions
2. Food packaging with PFAS testing/restrictions
3. Initiatives to hold manufacturers accountable
4. Public education
5. Support of initiatives on carpet & textiles
Thank you

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