Summary of the SETAC Focused Topic Meeting on PFAS

Heather Govenor and Alli Phillips

Presented to Human Health Risk Assessment Interest Group 9 October 2019; PFAS meeting held 12-15 August 2019 in Durham, NC
• Per- and Polyfluoroalkyl Substances (PFAS) are a class of fluorinated man-made chemicals

• Complicated chemistry – thousands of variations exist in commerce

• Uses: aqueous film forming foams (AFFF); food contact surfaces; polishes, waxes, and paints; stain repellants for textiles; cleaning products; dust suppression for chrome plating; electronics manufacturing; oil and mining; hydraulic fluids and fuel additives

• Human exposure routes: contaminated drinking water, food, house dust, workplace exposures, inhalation (?)
MEETING TOPIC AREAS

- Environmental Sources, Chemistry, Fate and Transport
- Exposure Assessment
- Ecological Toxicity
- Human Health Toxicity
- Risk Characterization
RISK CHARACTERIZATION

- Human health – North America*, Australia, Europe, U.S. States*
- Ecological Perspective on challenges and data gaps for short-chains (Canada)
- Development of Canadian Environmental Quality Guidelines*

- Conference presentations are available on the SETAC site:
  https://pfas.setac.org/scope-of-the-meeting/meeting-program-2/ (click “View available platform and poster presentations”)

* indicates areas where more information or data is needed.
HH RISK CHARACTERIZATION – NORTH AMERICAN PERSPECTIVE

- Michael Dourson with TERA
- Mostly focused on water exposures to human health
- Over 750-fold difference in determined “safe” water levels (example shown for PFOA)
  Presentation focused on the reason for the differences: choice of critical effect, models used, exposure assumptions etc.
- Harmonization must happen – these cannot all be correct
  For comparison, methyl mercury numbers are within 3-fold agreement
- Most work has been done on PFOS and PFOA – discussion re: prioritization of values development for the thousands of other chemicals; appropriate groupings?

<table>
<thead>
<tr>
<th>Agency</th>
<th>PFOA “Safe” water level (ppt)</th>
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<tbody>
<tr>
<td>ATSDR (2018)</td>
<td>10</td>
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<tr>
<td>EPA Action Level (2016)</td>
<td>70</td>
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<tr>
<td>Health Canada (2018)</td>
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<tr>
<td>Health Canada (2018)</td>
<td>30,000</td>
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</table>
HH RISK CHARACTERIZATION –
U.S. STATES’ PERSPECTIVE

• Gloria Post with New Jersey DEP
• Exposure pathways considered – drinking water, potable groundwater, surface water (fish consumption), soil ingestion
• ITRC Tables of PFAS Standards and Guidance Values are Available:
  • PFAS Water Values from EPA, states, countries (Table 4-1)
  • PFAS Soil Values from EPA, states, and countries (Table 4-2)
  • Values are updated often and international values are included on tables – visit the ITRC PFAS webpage for latest:
    https://pfas-1.itrcweb.org/fact-sheets/
### STANDARDS AND GUIDANCE FOR WATER

- Area of application of value
- Agency deriving value
- Type of standard/guidance
- Applicable media (GW, DW, SW/effluent)
- Promulgated?

- Notice PFOA and PFOS have most available standards, much fewer for other compounds

#### Table 4.1: Standards and guidance values for PFAS in groundwater, drinking water, and surface water/effluent (wastewater)

<table>
<thead>
<tr>
<th>Location</th>
<th>Agency/Dept</th>
<th>Year First Listed</th>
<th>Standard/Guidance</th>
<th>Type</th>
<th>Promulgated Rule (Y/N/O)</th>
<th>Footnote</th>
<th>PFOA</th>
<th>PFOS</th>
<th>PFNA</th>
<th>PFBA</th>
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<tbody>
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<td>USEPA Office of Water</td>
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<td>HA</td>
<td>GW</td>
<td>N</td>
<td>a</td>
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<tr>
<td>Regions 2014</td>
<td>RSL</td>
<td>GW</td>
<td>N</td>
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<tr>
<td>Regions 2015</td>
<td>RSL calculation</td>
<td>GW</td>
<td>N</td>
<td>c</td>
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<td>0.400</td>
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<td>Alaska (AK)</td>
<td>DEC</td>
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<td>CL</td>
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<tr>
<td>DEC</td>
<td>2018</td>
<td>Action Level</td>
<td>GW/SW</td>
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<td>California (CA)</td>
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<td>Colorado (CO)</td>
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<td>Connecticut (CT)</td>
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<td>Guidance Values</td>
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<td>HNV</td>
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This Table 4.1 belongs with the ITRC PFAS Regulations, Guidance and Advisories Fact Sheet. The values included here reflect values we are aware of as of August 31 gathered. The fact sheet user is encouraged to visit the ITRC PFAS web page (http://fas-1.itroweb.org) to access the current version of this file. Please see ITRC Disclosure.
STANDARDS AND GUIDANCE FOR SOIL

- (Transposed format from water table)
- Soil for GW protection and soil for direct exposure values are available (human health based)
- Orders of magnitude differences among state values
- EPA, AK, ME, MI, NC, TX, DE, IA, MN, NV, NH plus 6 countries have soil values
- Again, notice PFOA and PFOS have most available standards, much fewer for other compounds
HH RISK CHARACTERIZATION – AUSTRALIAN PERSPECTIVE

• Andrea Hinwood, Environmental Protection Authority, Australia

• Similar to US – there is a Federal Government in Australia and individual states

• Australian government PFAS repository

• PFAS National Environmental Management Plan (2018)

• Draft Commonwealth Environmental Management Guidance on PFOS and PFOA (2016)

• Health Based Guidance Values
KEY OUTCOMES FROM RISK CHARACTERIZATION
BREAKOUT GROUP

• Risk communication (including uncertainties) needs to be a bigger component of risk characterization

• Need agreement/ additional evidence to support choice appropriate application of toxicity data: critical effects, experimental species, timeframes of effects assessment

• Need agreement on appropriate model parameters, exposure assumptions, uncertainty factor application (harmonization of risk conclusions is needed to obtain public trust in the process)

• These are ubiquitous contaminants so background considerations matter – need for understanding of multiple sources and pathways of exposure, site attribution
• Use of standard approaches should be continued – think outside the box – but don’t forget there is a box and it’s very useful

• Likely risk will be evaluated by classes of PFAS vs. one large group or individual chemicals
  • Too many individual chems and they occur in mixtures so exposure is to mixtures
  • Classes differ in toxicity, mobility, etc
  • Consider development of relative potency factors for ecotox using whole effluent analysis
USEFUL LINKS

• PFAS-related articles in IEAM and ETC journals published by SETAC
• US National Toxicology Program website
Estimating Environmental Hazard and Risks from Exposure to Perfluorinated and Polyfluorinated Alkyl Substances (PFAS): Outcome of a Focused Topic Meeting

1:00 p.m. - 4:15 p.m. | Tuesday, 5 November | 713A

Chairs: Mark Johnson, Robert Buck, Ian Cousins

SETAC experts will review the state of the science relevant to environmental risk assessment of PFAS and summarize outcomes of discussion at the recent Focused Topic Meeting.
QUESTIONS?

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• Alli Phillips, Arcadis  Allison.Phillips@arcadis.com