PFAS in North Carolina

DEQ’s Priority PFAS Group 1

- PFMOAA
- PMPA
- PFO2HxA
- PEPA
- PFO3OA

- These are PFAS that are specific to NC and the waterbodies sampled in the lower Cape Fear region.

- There is not much existing toxicity information for these PFAS.
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<table>
<thead>
<tr>
<th>PFAS Compound</th>
<th>Exposure Data</th>
<th>Toxicology References</th>
<th>Human Biomonitoring Studies</th>
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<tbody>
<tr>
<td>PFMOAA</td>
<td>DEQ, NCSU</td>
<td>3 (1–3)</td>
<td>2 (2,4,5)</td>
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<td>PMPA</td>
<td>DEQ, NCSU</td>
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<td>1 (7)</td>
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<tr>
<td>PF02HxA</td>
<td>DEQ, NCSU</td>
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Priority PFAS – Group 1

- How can we regulate PFAS that have no toxicity data?

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“Grouping” PFAS is complicated and should be done using scientifically sound and defensible methods that utilize as much toxicological and biochemical data as possible.

The SAB has heard from multiple researchers, states, and government agencies regarding methods to group and/or regulate PFAS compounds.

There are 2 that utilize much of the toxicological information available to extrapolate through data-heavy methods.
PFAS Data Extrapolation Methods

1- Relative Potency Factor Approach - builds on the assumption that the combined toxicity of two or more substances can be calculated based on the concept of dose addition, whereby the substances have the same effect, but differ only in their toxic potencies.

2- Grouping by Adverse Effects/ Mechanism of Action - The most demanding grouping approach would be to only group PFAS that have the same adverse effects, modes and mechanisms of action, and toxicokinetics for risk assessment.
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<th>Individual approaches*</th>
<th>PFAS grouped</th>
<th>Data requirements</th>
<th>Advantages</th>
<th>Limitations</th>
<th>Note</th>
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<td>Relative potency factor approach</td>
<td>multiple PFAAs</td>
<td>toxicity (including potency), toxicokinetics</td>
<td>cumulative risk assessment approach that accounts for differences in toxicokinetics &amp; toxic potencies</td>
<td>limited to increasing liver size and to PFAAs now, while other endpoint(s) may be more important; resource &amp; data intensive</td>
<td>high throughput testing methods being explored for potential expansion of the scope</td>
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<td>Grouping only PFAS with similar adverse effects, mode/mechanism of action and toxicokinetics</td>
<td>limited PFAAs</td>
<td>toxicity, modes/mechanisms of action, toxicokinetics</td>
<td>cumulative risk assessment that is scientifically stringent</td>
<td>resource &amp; data very intensive; variabilities of these properties across PFAS not well understood</td>
<td></td>
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Cousins et al. 2020
PFAS Data Extrapolation Methods

How do we collect the existing PFAS toxicology data and use it to extrapolate the data for PFAS without their own toxicity information?
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EPA’s Center for Computational Toxicology and Exposure
1. Created a PFAS Screening Library
   • Identified 75 PFAS to conduct high-throughput toxicity testing
2. Conducted Bioactivity Profiling related to Molecular Structure
   • 142 PFAS screened in human liver cells
   • Examined new and known PFAS targets for activation
   • PFAS structural features were correlated with biological targets.
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Bioactivity profiling of per- and polyfluoralkyl substances (PFAS) identifies potential toxicity pathways related to molecular structure

A Chemical Category-Based Prioritization Approach for Selecting 75 Per- and Polyfluoroalkyl Substances (PFAS) for Tiered Toxicity and Toxicokinetic Testing
Grace Poliwiecz, Ann M. Richard, Antony J. Williams, Christopher M. Grahn, Reed Sams, Jason Lambert, Pamela D. Neves, Michael J. DeVito, Ronald N. Hines, Mark Strynar, Annette Guiseppe-Elici, and Russell S. Thomas
Request to the Science Advisory Board

1- Review the EPA’s computational studies in detail.
   Is the method the EPA is using to extrapolate PFAS is appropriate for extrapolating for the Priority PFAS in NC?

Request tabled until after potential presentation from the EPA
Thank you

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