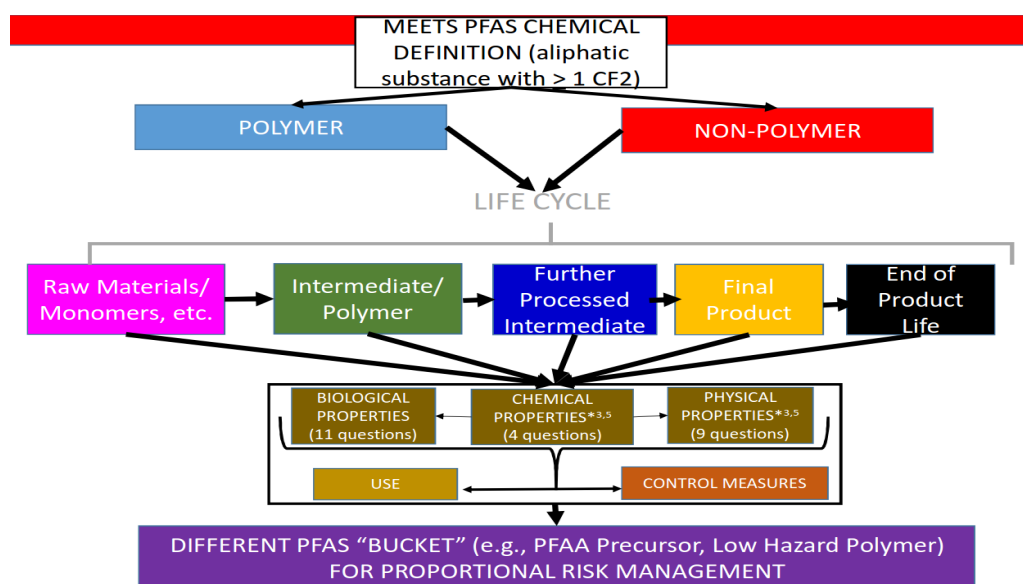


Proposal for Grouping PFAS by Relative Risk

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This document provides an in depth look at a PFAS grouping proposal based on relative risk originally published online. See <https://news.bloomberglaw.com/environment-and-energy/insight-finding-a-middle-ground-on-pfas-using-a-four-step-process>

All substances with at least one fully fluorinated carbon would be screened for biological, chemical and physical properties, shown in the brown boxes below. This screening should occur at each stage of the PFAS' life cycle.



Biological properties include toxicity (mammalian and ecological, human, animal, aquatic), potency (comparing the lowest effect level in the same species for the same toxicity endpoint to other substances), bioaccumulation potential and biodegradation data. Chemical properties include reactivity and potential to leach from a landfill by a standard EPA test. Physical properties impacting substance behavior include molecular weight, vapor pressure, environmentally relevant thermal stability, biotic and abiotic stability, water solubility, potential for long range environmental transport, and potential to partition to air, water or soil.

The chemical, physical and biological screening (Step 1) would create health and environmental hazard categories of PFAS meeting the definition (e.g., health hazards: acute toxins, chronic toxins, carcinogens, mutagens, reproductive/developmental toxins, sensitizers, bioaccumulative substances; environmental hazards: acute or chronic aquatic toxins, persistent and water soluble, degrading into persistent and water soluble substances, volatile or adsorbing to soil, mobile with air or soil in the environment, etc.) In the absence of data to the contrary, these chemical, physical and biological questions should be assumed to present the hazard for grouping purposes.

The uses of the PFAS are identified in Step 2. These could be widely dispersive (e.g., cosmetics, pesticides, children's products) or more restricted (e.g., medical device, durable article, processing agent). This step provides insight into the exposure potential of the PFAS in its intended uses.

The third step identifies available and effective control measures (e.g., effective environmental controls/Best Available Technology such as thermal oxidizers, occupational hygiene programs, recycling, reuse, buy/take back, labeling, permitting, incineration).

In this four-step process for PFAS grouping, at each stage of the lifecycle (e.g., raw material manufacture, processing to intermediate forms, intermediate processing to final articles/products, and end of life), the hazard(s), plus the use(s) (exposure potential), plus effective control measures should be identified. Hazard plus use plus effective control measures will identify the residual risk (Step 4) of the PFAS to be managed. Management may include restrictions on use or additional control measures to decrease exposure potential. Ultimately, those PFAS with the same hazard (e.g., carcinogen, mobile, water soluble, low molecular weight, not biodegradable) and uses (e.g., manufacturing aid or food contact material) and control measures could be considered "PFAS subgroup", such as PFAAs, precursor to PFAA, or low hazard polymers, etc. for regulation/restriction/management.

This approach should be used by the California Air Resources Board and the Office of Environmental Health Hazard Assessment to prioritize various PFAS for development of Health Reference Values for use in California's air toxics regulatory programs. This prioritization process is relevant to both the ChemSet 1 and ChemSet 2-designated PFAS in CARB's revised Appendix A list for the Air Toxics Hot Spots Emissions Inventory Criteria and Guidelines regulation (July 29, 2020). It may indicate that agency resources should be focused on a subset of PFAS rather than trying to encompass all known substances in commerce regardless of their potential human health or environmental risk.