

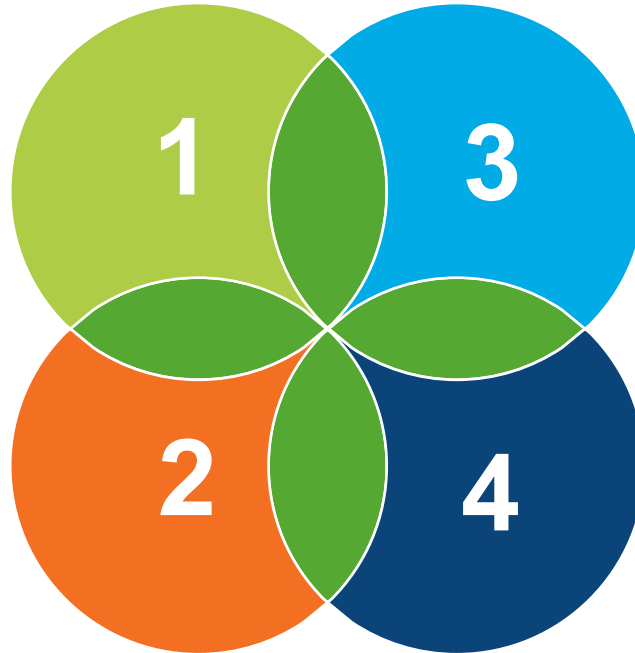
Best Practices in Applying the Value Chain to Remove Chemicals of Concern in Food Packaging

Summer 2023: by Dr. Claire Sand -
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Key Takeaways

PFAS regulations are creating stress

PFAS sources in food are from production, processing and packaging

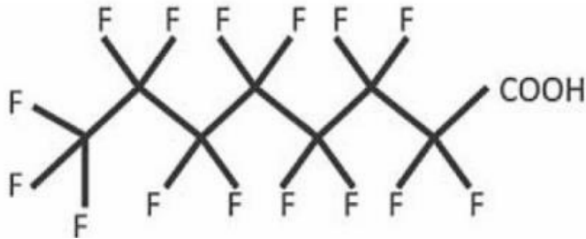


Industry has worked hard with a fragmented approach and pitfalls

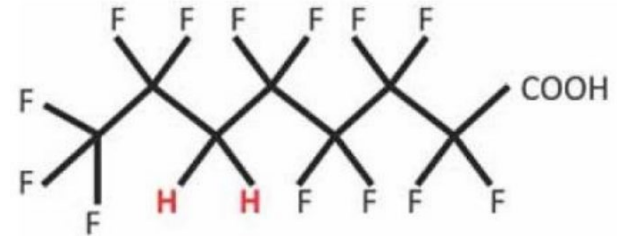
Future Proof Packaging is needed to avoid the pitfalls of a fragmented approach



PFAS Overview



- **Perfluoroalkyl substances**
- All **Hydrogens** attached to **Carbons** are replaced by **Fluorine**
- Few degradation products and stable
 - Many degradation products



- **Polyfluoroalkyl substances**
- Some **Hydrogens** attached to **Carbons** are replaced by **Fluorine**
- Can participate in condensation polymers such as PET
- Many degradation products



Despite Industry efforts, PFAS is Still a Concern

Regrettable substitutions exist

- LCPFAs phased out in 2016
- SCPFAS phased out in 2020
- Regrettable substitutions exist
- Game of whack-a-mole

Hiding behind regulations catches many off-guard

- Data was hidden from FDA
- GRAS status is dubious
- Delayed harmonious regulatory action
- Reliance on voluntary abandonments

Shape-shifting supply chain

- Snapshots do not protect brands or consumers

Hodge-podge of local and retailer bans

Extensive incoming inspection is costly and is not in alignment



Value Chain provides the opportunity to... *Future Proof Packaging*

- ❑ Proactively Plan for the **Future** - Avoid kicking the can down the road with regrettable substitutions
- ❑ Build a more valued **safety-focused** relationship with regulatory agencies
- ❑ Build/rebuild **Trust** in all entities of the packaging value chain
- ❑ **Align** vs Entrap value chain partners
- ❑ **Collective work** builds a better shared future



4 Key Elements to *Future Proof* Packaging

Adjust to Reward
Significance in
Relationships



Inspire From
The Top



Manage
Knowledge



Share
Work



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A *Future Proof* Packaging Approach Adjust to Reward Significance in Relationships



- ❑ Focus on the value in relationships
- ❑ Internalize relevant externalities
- ❑ Define meaningful incentive system for compliance between value chain entities
 - ❑ At all levels of organizations
- ❑ Address economic pressures in value chain by balancing costs and profits



A *Future Proof* Packaging Approach

Inspire from the Top



- ❑ Top-down focus
- ❑ Shift from legal protection to inspiring action
- ❑ Define role of PFAS and other Chemicals of Concern in UNSDGs, ESGs and CSV
- ❑ Establish Value Chain linkages with all entities in the Value Chain
- ❑ Redefine productivity



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A Future Proof Packaging Approach

Share Work



- Move beyond Taskforces to actual work
- Build a Chain of Custody to instill confidence
 - reduce fraud and add value
- Deliver on shared innovations
- Deliver on joint systems solutions
- Work toward harmonized standards to avoid a 2-tier system in which some citizens are protected for chemicals of concern by regulations and some are not



A Future Proof Packaging Approach

Manage Knowledge



- Manage Human knowledge**
 - Involve inhouse and out-of-house seasoned experts
- Manage Social Knowledge**
 - Focus collectively on sources of PFAS
 - Define what regrettable substitutions should not be used
- Manage Structured Knowledge**
 - Define and share what is needed for joint systems solutions
 - Share knowledge transfer at all organizational levels



Case Studies



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A Future Proof Packaging Approach

Case Studies

System solutions to replace for oil and grease resistance need in FOH QSR french fry cartons

- **Reduce oil in contact with packaging via a systems approach using one or all of these solutions**
- **Reformulate fries to**
 - Enhanced PME-based oil resistance so that less oil is adsorbed
- **BOH Processing to**
 - Adsorb oil prior to FOH packaging with diatomaceous earth or food grade clays
 - Use a 2-phase system in which oil is drained more extensively at a station before final FOH packaging
- **Non-PFAS plastic (reusable) packaging**
- **Package redesign to**
 - Employ a removeable plastic liner within FOH cartons
 - FOH cartons with a sealed low point with an adsorbent substance
 - FOH cartons dusted with an adsorbent substance
 - PFAS sensors on packaging for value chain use



A Future Proof Packaging Approach

Case Studies

Reduce need for a high barrier in direct product contact via a systems approach using one or all of these solutions:

1. Advance Barrier technology from 1990s into 2020s

- Provide barrier with enhanced polymer technology in the form of PTF, PEF, or PEN
- Nanoclays to increase tortuosity
- Barrier layers of EVOH, SiO_x
- Waxes – but this interferes with recycling

2. Flip the barrier

- Food contact packaging with minimal barrier
- Provide secondary packaging with enhanced barrier

3. Reduce what needs to be controlled

- Combine secondary and primary packaging investment for overall less packaging to monitor

4. Implement Intelligent packaging

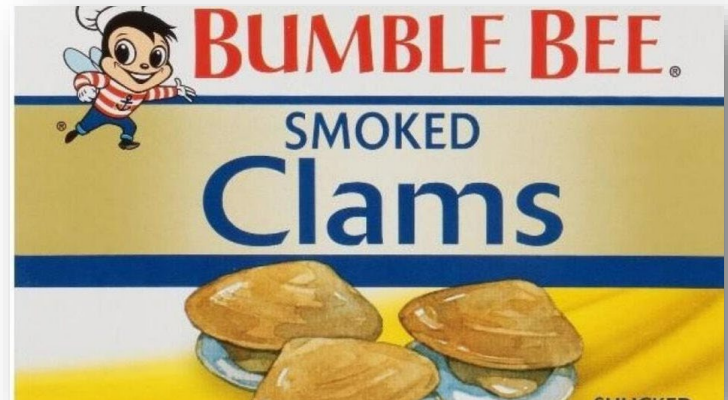
- PFAS sensors on packaging for value chain of custody



A Future Proof Packaging Approach

Case Studies

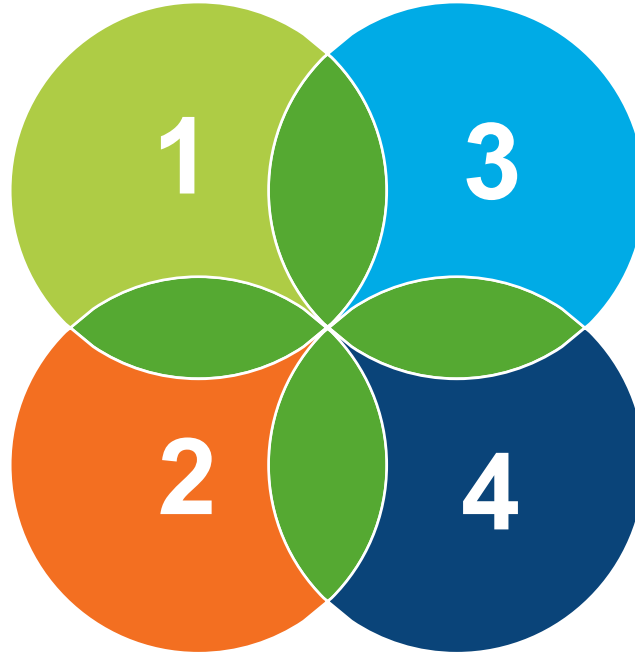
- **Reduce PFAS from contaminated water and feed in all seafood**
- **Align with other stakeholders and take shared responsibility**
 - This is instead of – “whew, the pressure of off packaging PFAS is everywhere!”
 - Work to define sources and then mitigate those sources
 - Engage seafood workers in re-engaging to earn a living in working on PFAS-free fishery development
- **Clean-up water**
 - Engage to clean-up fisheries at issue so people can earn a sustainable living and sell safe seafood
- **Manage knowledge**
 - Link solutions with packaging that communicates “products with no PFAS”
 - Define what is needed to provide assurances of “no PFAS”



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Thank You



**Reach out to connect for
a virtual coffee**

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