



## **The Cycle of PFAS and its Evolving Landscape Q&A**

### **Part 1: The Cycle of PFAS**

**Q: What evidence or data that suggests that AFFFs are the cause of the majority of contamination in water streams?**

– **A:** Answered in Webinar

**Q: How do you reconcile the concerns surrounding short-chain PFAS generated during fluoropolymer manufacturing and end-of-life breakdown (incineration, long term degradation in landfills)?**

– **A:** Answered in Webinar

**Q: Are there other pfas being used instead of perfluoropolyethers for grease proofing plant based food packaging?**

– **A:** Answered in Webinar

**Q: What happens to PFAS when burned in waste-to-energy plants? Connecticut, for example, burns a large percentage of its municipal solid waste.**

– **A:** Answered in Webinar

**Q: What is the most secure/complete disposal method? Is there data on Class C landfills pfas release?**

– **A:** Answered in Webinar

**Q: Can you elaborate on the piece that not all PFAS compounds can be quantified in labs?**

– **A:** PFAS are a class containing thousands of chemicals. Commercially available analytical methods do not have reference standards for all PFAS. Also, many compounds are present below method detection limits. US EPA Method 1633 reports reliably 40 PFAS and can detect and identify dozens more.

**Q: Has a study been conducted on PFAS uptake into crops where biosolids have been land applied to farmlands?**

– **A:** Answered in Webinar

**Q: If PFAS in landfill gas is negligible, do you expect the regulatory agencies to regulate gas in regard to PFAS in the future, (understanding that this is just an opinion since its hard to know what will be regulated)**

- **A:** Answered in Webinar

**Q: Will we be hearing more about treatment of PFAS-contaminated waters and soils?**

- **A:** Yes; potable water treatment is already a billion-dollar sector.

**Q: Has a study been conducted on PFAS uptake into crops where Biosolids have been land applied to farmland?**

- **A:** Yes, among others by Prof. Linda Lee of Purdue University.

**Q: Are pFAs present in bioplastics?**

- **A:** Generally, plastics are cross contaminated with PFAS from manufacturing equipment, not part as the product formulation.

**Q: what is the cost efficient and efficient pfas removal process for wastewater plants?**

- **A:** There is no ‘one fits all’ answer. It depends on the existing equipment, discharge requirements, and managing PFAS in the incoming raw wastewater. The ‘best’ option is reducing PFAS entering wastewater in the first place.

## **Part 2: The Evolving Landscape of PFAS**

**Q: We also understand that PFAS are used as mold release agents in paper-board food bowls and trays, that could potentially remain as a food-contact substance. Did you ever have any FCNs for that use?**

- **A:** PFAS-based grease-proofing agents were authorized formerly for use in molded fiber which allowed for release in paper and paperboard products. However, those uses have all been revoked. As such, we do not have any PFAS based authorizations remaining for this use.

**Q: Does FDA review the use of fluorinated polyethylene in fertilizer or pesticide containers and if not, who does or is there any information on this?**

- **A:** FDA does not have jurisdiction over fertilizers or pesticides. I understand some pesticides fall under EPA. I recommend reaching out to EPA on fluorinated HDPE for pesticides.

**Q: Does this mean that there is no longer PFAS in microwave popcorn bags?**

- **A:** Yes, PFAS is no longer authorized for use in microwave popcorn bags.

**Q: So non-stick pans and food wrapping paper are safe?**

- **A:** PFAS found in non-stick pans is safe based on current information. PFAS found in food wrapping paper such as sandwich or bakery items are no longer authorized.

**Q: What kind of steps (if any) are regulatory agencies taking to help improve the quality of the analytical testing landscape for industry? There are a lot of concerns about the reproducibility of the testing, even when following a standard method.**

- **A:** FDA's researchers are working on developing new methods for PFAS analytical testing. Specific to food contact, they have developed a method to detect the 6:2 FTOH. There are several scientific publications on this effort.

**Q: What happens to non-stick pans that are scratched?**

- **A:** non-stick coatings that delaminate are not bioavailable if ingested. As such, even if they are scratched, there are no health concerns from the PFAS coating.

**Q: Are there concerns that these high molecular weight PFAS could pose a risk once they are landfilled or burned?**

- **A:** landfill and burning of these materials would not fall under FDA jurisdiction. I would recommend reaching out to EPA on questions related waste management and impact.

**Q: So high amounts of pfas are from water, food and consumer products and not non-stick pans and food wrapping?**

- **A:** There are various publications and surveys out in the scientific literature evaluating human PFAS exposure. I will note that dietary exposure from PFAS from food contact are minimal and virtually negligible now that grease-proofing agents are no longer authorized.

**Q: For consumers, how do we dispose of pfas contaminated items?**

- **A:** Typically the same as any other items – these items can go into the regular trash. PFAS consumer contaminated items are not hazardous wastes per definition under the EPA's Resource Conservation and Recovery Act (RCRA), which means that they can go to any waste handling or disposal facility. There are a few caveats to this: some waste handling or disposal facilities may have specific provisions in their licenses or specific internal policies which may limit the types of wastes that may be accepted. They can choose not to accept these items, but because PFAS is in most consumer products, this has not happened at most waste management facilities.

It is important to make the distinction between a “hazardous waste” and a “hazardous substance”. While the Comprehensive Environmental Response Compensation and Liability Act (CERCLA), identify PFOA and PFOS as hazardous substances, these same chemicals are not defined as hazardous wastes. The term hazardous waste has implications for how items are managed upon disposal whereas the term hazardous substance has implications for how contaminated sites must be remediated/cleaned up.

**Q: If you ban it, where does it go?**

– **A:** Answered in Webinar

**Q: How do we support legislation to change manufacturers to become a closed system and be responsible for disposal?**

– **A:** Answered in Webinar

**Q: How have these developments affected certified organic farms?**

– **A:** Answered in Webinar

**Q: What kind of treatment technologies have Maine WWTPs been investigating as an alternative to landfilling?**

– **A:** Answered in Webinar

**Q: Susanne, did you find that most of the higher-contaminated sites were from certain paper mills' sludge or certain WWTPs? Or was it more ubiquitous?**

– **A:** Answered in Webinar

**Q: How did the PFAS get into the sludge in Maine? Through water which has PFAS from?**

– **A:** Answered in Webinar

**Q: What was the selection process for the Aries technology?**

– **A:** Answered in Webinar

**Q: Can we ban import of pfas products?**

– **A:** Answered in Webinar

**Q: For Susanne Miller, regarding the transportation of sludge up to Canada for composting: how much did that cost, and who was responsible for covering the bill (individually municipalities, funds from state grants, etc.)?**

– **A:** Answered in Webinar

**Q: Susanne, when you reference PFAS bans on products, is it specific to the 40 PFAS per 1633 or other classes of PFAS compounds**

– **A:** Answered in Webinar

**Q: RE: Maine's sludge management crisis, as the wastewater plants are generally publicly funded, who footed the bill for the increased costs of managing the materials after the land application ban?**

– **A:** Answered in Webinar

**Q: Two questions - what was the origin of the PFAS in the sludge? I understand that the cost for biosolids management increased wastewater management costs exorbitantly - how was this addressed with ratepayer increases?**

– **A:** Answered in Webinar

**Q: Susanne, can you say what sources of PFAS you suspect were in the sludge? Was it mostly suspected to be from paper sludge was a major part of sludge land application for decades and much of that paper was grease repellent paper?**

– **A:** Answered in Webinar

**Q: Susanne - how are you handling PFAS in products sold through an online retailer? Are there mechanisms to ban products that are bought directly through an online source and delivered to the state.**

– **A:** Answered in Webinar

**Q: Thomas, what do you think is the cause of the downward trend of PFOA and PFOS in biosolids? Thank you**

– **A:** Identification of significant industrial users in the influence to wwtps. discontinuing introduction of high PFAS impacted sources to the water waste stream... i.e. fire fighting foam

**Q: Have folks done studies on the animals that eat the grasses or crops that grew in areas where biosolids were spread?**

– **A:** Answered in Webinar

**Q: Are non-stick pans safe if scratched and may be leachign chemicals?**

– **A:** Answered in Webinar

**Q: Did the study on non-stick pans consider wear/tear and peeling?**

– **A:** Answered in Webinar

**Q: Will supporting EPR (extended producer responsibility) help?**

– **A:** Answered in Webinar

**Q: Are there any plans at the FDA to do further research on migration potential of PTFE in cookware? I have seen some studies that disagree that there is negligible migration of particles from the PTFE coating into food. Also, if heated improperly PTFE cookware releases fumes that can cause illness to humans and kill pets.**

– **A:** Answered in Webinar

**Q: Susanne, in your role are you working with the other landfill operators for implementation of leachate pretreatment or requiring treatment to close the PFAS cycle given that they are being heavily relied on for the disposal of residuals**

- **A:** The Maine Legislature’s Joint Committee on the Environment and Natural Resources just passed a bill out of committee (L.D. 2070) requiring certain new or expanded landfills to have leachate treatment for PFAS. The bill language was just finalized this week, and it will head to the House and Senate chambers. To track progress of this bill, you can visit the Maine Legislature’s website ([Maine State Legislature](https://www.maine.gov/legis)) and type in 2070 to look at bill documents and process.

**Q: I apologize if I missed this in the presentation, but approximately what year or timeframe did grease-proofing agents, used in food packaging and other food-migration sources, get removed?**

- **A:** PFAS based grease-proofing agents were phased out between January 2021 through the end of 2023. Downstream supply chains were expected to exhaust supplies by mid-2025. FDA revoked the authorizations in January 2025. More information may be found on our website: <https://www.fda.gov/food/process-contaminants-food/market-phase-out-grease-proofing-substances-containing-pfas>

**Q: What programs and policies do Maryland and Maine have in place to support the incorporation of sludge into building materials, like clay bricks, tile, cement clinker and road construction?**

- **A:** Using class B biosolids in any products would require those products to follow all regulations that pure class B biosolids would. We have not encountered any businesses incorporating biosolids into bricks, tiles, and building materials
- In Maine this is being evaluated as an option but is not fully understood in terms of short and long term risks.

**Q: For the PFAS impacted biosolid sites in Maine, has any follow up groundwater sampling been done since the 2022 ban to see if there's been any concentration reductions?**

- **A:** Maine is still conducting its initial statewide soil and groundwater investigation that began in 2021. As there are over 1,066 sites, we anticipate the investigation will wrap up some time in 2028. Where we have found contamination in groundwater that exceeds the state’s interim drinking water standard, and as a result have installed point of entry filtration systems at those residences, we conduct ongoing monitoring and maintenance to ensure they are working effectively. What we’ve observed from this ongoing work is that there is variation over time in the levels and types of PFAS detected in different samples. That variation may be the levels of PFAS increasing or decreasing. There’s no single trend that we’ve observed at this point. We think this may have to do with seasonal and other environmental factors.

It is important to note that many of the PFAS we are finding in groundwater as part of Maine’s investigation are from legacy PFAS waste – land application activities that took place decades ago.

**Q: does WM treat the leachate for other contaminants such as metals or just foam fractionation for pfas**

- **A:** The Foam Fractionation system was designed for treating PFAS. Leachate that has been treated for PFAS then goes to a nearby Wastewater Facility for treatment for other contaminants as required by its MEPDES permit (Clean Water Act) prior to discharge. At this time there are no Clean Water Act standards for PFAS treatment in wastewater, but there are standards under the Clean Water Act for wastewater discharge for many other types of contaminants including metals, organics, temperature, turbidity, dissolved oxygen and more.

**Q: Have you had any success getting industry or other origins of PFAS to pay for these processes?**

- **A:** Many states including Maine are actively involved in litigation against manufacturers of PFAS chemicals. This is a long process that will take years to resolve. Thing about tobacco as a comparison – those lawsuits took a long time as will these.

**Q: I'm still somewhat perplexed on the gasification application - was there any evaluation of different technologies, or will the technology selected by default by virtue of being built, provided it meets requirements?**

- **A:** The state's role is not to decide for commercial industry or businesses what technology they should or should not pursue for their business. That is something unique to each business to decide. For example – the state would not tell a baker that they can only bake sourdough. It is up to the bakery to decide whether they want to bake sourdough or something entirely different like cupcakes.

Whether a business is proposing to bake sourdough or run a gasification plant, the state's role is to review an application based upon the specific technology or process proposed, and then make a determination as to whether the business does or does not meet the requirements outlined in law and regulation. The state does this by reviewing an application. If the requirements are met, an application is approved. If the requirements are not met, an application is not approved.

If you are interested in learning why Aries chose gasification rather than any other technology – I'd recommend reaching out to Aries directly for further information.

**Q: For Maine, are there cases where farms who had compost (not from composted biosolids) have concerning PFAS levels? Curious about how much PFAS might be in compost and transfer in to the soils**

- **A:** Maine's statewide soil and groundwater investigation only pertains to sludge and septage (Maine residuals). While the investigation includes both Class A and Class B

biosolids, the key is that the materials are sludge derived. Compost that is not “composted biosolids” is not part of the state’s investigation.