

RACC Presentation to Maury Service Authority Board

March 29, 2022

Environmental Impact of Biosolids

Presentation Goals

- Provide general background on Per- and polyfluoroalkyl substances (PFAS).
- Educate the public officials and community members about the health risks of PFAS exposure and how to best avoid them.
- Communicate the dangers of PFAS associated with Landfill Leachate, Biosolids, and Effluent.
- Ask MSA to collaborate with RACC and other local organizations to investigate presence of PFAS locally, educate the public and government about PFAS and support efforts to learn more about PFAS.

PFAS: General Background Information

PFAS are a class of thousands of chemicals that are known as *“Forever Chemicals”*

- They can persist in our bodies and in the environment for periods ranging from several years to decades:
 - **16 years** in the human blood
 - **184 years** in soil
- They have spread throughout our world and can be found in soil, water, air and in most living things as well as in untold numbers of consumer and agricultural products.
 - Virtually all products containing PFAS end-up in landfills and wastewater treatment plants (WWTP) via leachate and commode.
- They include PFOS and PFOA chemicals

Where are PFAS found?

- 98% of Americans have one or more PFAS in their blood (Center for Disease Control & Prevention).
- 100% of breast milk samples contain PFAS (independent research)



There are No Safe Limits for PFOA/PFOS

For chemical contaminants in drinking water that are carcinogens, EPA sets the maximum contaminant level goal (MCLG) at **ZERO** if both of these are the case:

- 1) “there is evidence that a chemical may cause cancer,” and
- 2) “there is no dose below which the chemical is considered safe”

*PFOA/PFOS are **known carcinogens** (kidney, bladder, liver, pancreas, testes, prostate, thyroid, and breast) based on 3 rodent studies, 1 trout study and 3 human epidemiological studies.*

*Individual exposure levels (**dose**) of PFOA/PFOS cannot be determined because there are so many sources of exposure.*

There are No Safe Limits for PFOA/PFOS

First rule of toxicology:

*“It’s The (COLLECTIVE) Dose, Not The
Poison”*

Precautionary Principle: “Do No Harm”


The precautionary principle enables decision-makers to adopt precautionary measures when scientific evidence about an environmental or human health hazard is uncertain and the stakes are high.



States with Public Health Concerns/Health Issues

- There are no enforceable state or federal regulations in Virginia.
- Virginia Department of Health has a PFAS task force studying the issue
- Studies have already found that PFAS are present, damaging the environment and people
- 8 states* already have **Advisories** on fish and/or deer meat

* AL, AK, ME, MI, MN, NH, NJ, WI



States with Public Health Concerns/Health Issues: Case Studies

Wisconsin

- PFAS can contaminate dairy products if the farm's water, feed, or **soils are contaminated** via aqueous film-forming foam (AFFF), **fields being spread with contaminated sludge**, and industrial discharge.
- Potential **“cost could be considerable.”**

New Mexico

- PFAS contamination of groundwater via AFFF affected a 4,000 head farm.
- This caused them to dump 15,000 gallons of milk a day and lay-off most employees.
- With no revenue from milk sales and unable to sell the cows the **“farm is facing euthanizing the herd”**.

States with Public Health Concerns/Health Issues: Case Studies

New Hampshire

- 16 deer were sampled and tested (liver and muscle).
 - Elevated levels of cadmium and PFOS were detected.
 - 3 of 15 liver samples (20%) were positive for PFOS with **levels ranging from 8.6 – 33.2 ng/g (ppb)**.
 - **“As a result, the NH Fish and Game Department recommends that no deer liver be eaten.”**

Maine

- Arundel: Sludge containing PFAS was spread on a farm as fertilizer.
 - The milk tested at **690 ppt for PFAS (10x EPA’s guideline)**.
 - More than two years on, the owners still cannot sell the milk from these cows.
 - They estimate spending \$10,000 on testing and are losing over \$400 daily (~\$150,000/yr).
- Fairfield: the meat/livers of 8 deer were collected in close proximity to several farms that spread **municipal/industrial sludge for fertilizer** or **manure from contaminated animals**.
 - PFOS **soil levels** ranged between **300 to 1,000 ng/g (ppb)** range, and surface **water levels** in the **6,000 to 7,000 ng/L (ppt)** range.
 - **Liver samples** were **4- to 51-fold higher than muscle tissue**.
 - As a result, restrictions were placed on the consumption of **deer liver to 1 meal per year for children and adults** and **2 meals a year for children and 4 meals for adults of deer meat**. (based on The Agency for Toxic Substances and Disease Registry [ATSDR] safe levels of 2 ng/Kg/day = ppt/day).

Commercial Biosolids, PFAS Content and Public Health

Products	Purchased	Biosolids Source	Percent Biosolids	PFOA (PPB)	PFOS (PPB)
Cured Bloom	W.S Jenks & Sons Washington DC	Washington DC Water-Blue Plains Advanced WWTP	100	23.8*	22.1*
Earthlife Natural Fertilizer	York Woods Tree & Products, Eliot, ME	Quincy, MA – New England Fertilizer Co. (NEFCO)	100	2.75*	17.3*
EcoScraps Slow Release Fertilizer	The Home Depot	Unknown – company based in Nevada	100	1.2	16.9*
GreenEdge Slow Release Fertilizer	The Home Depot	Jacksonville, FL – JEA sewer collection system	100	1.39 – 1.66	12.9 - 13.5*
Menards Premium Natural Fertilizer	Menards	Unknown – company based in Wisconsin	100	1.01	9.05*
Milorganite 6-4-0 Fertilizer	The Home Depot	Milwaukee, WI – Metro- politan Sewerage District	100	0.67	8.66*
Pro Care Natural Fertilizer	Lowes	Georgia (Multiple locations)	85.5 – 91.5	0.94	14.9*
Synagro Granulite Fertilizer Pellets	Sacramento, CA Pelletizer	Elk Grove, CA – Sacramento Regional WWTP	100	0.95	3.71
TAGRO Mix	Ace Hardware	Tacoma, WA – Central WWTP	50	7.51*	7.92*

***Maine State Biosolid limits: PFOA: 2.5 ppb, PFOS: 5.2 ppb**



Commercial Fertilizers, PFAS Content and Public Health

- PFAS removal technology has focused mainly on drinking water (not biosolids).
- Storing/disposing of contaminated biosolids is not a permanent solution
- Commercially available methods to capture and remove PFAS from biosolids are under development.
- Avenues being pursued “collectively” with other scientists:
 - Biological decomposition (organisms)
 - Chemical separation (binding)
 - Physical separation (weight)
 - Partition to water (filter)
 - Incineration (above 1000°C)



In Conclusion

- PFAS chemicals cause cancer and other diseases.
- PFAS is found throughout the food chain and in thousands of everyday products.
- Application of biosolids that contain PFAS contaminates **the land**, wildlife, livestock, and animal feed leading to contaminated milk and meat.
- Commercially available methods to capture and remove PFAS from biosolids are under development.



Working Together: MSA & RACC

- Investigate:
 - Work with other agencies and organizations to determine if PFAS chemicals exist in our wastewater, biosolids, soil, and water.
 - Convene a working group to investigate PFAS use in Rockbridge County, and identify, reduce, and eliminate sources of PFAS to our Community's drinking water and wastewater that can be controlled locally.
 - Participate in scientific studies to better understand how to remove PFAS.
- Educate:
 - Educate government officials and the public about the dangers associated with PFAS
 - Educate consumers about PFAS in products that they purchase
 - Information sharing between organizations
- Support:
 - Support efforts of those working at state and federal levels to regulate PFAS to which we are exposed
 - Support efforts to solve the larger aspects of the PFAS problem that will help protect our citizens from toxic chemicals.

Thank you

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