Micro Learning Session: Hot Topic Review & Resources

- Stormwater Meet Compost: Leveraging SB 1383
- PFAS and the Compost Industry: US Compost Council
- Understanding Gasification for PFAS Removal: WRF
- Essential Public Service: Rule 1302

Tom Koutroulis, August 20, 2025

Stormwater Meet Compost: Leveraging SB 1383

Stormwater Meet Compost: Leveraging SB 1383 to Fund Climate-Resilient Stormwater Solutions
(9/16/25 Pasadena)
California Stormwater Quality Association | CASQA

- What was once waste is now a watershed solution.
- The intersection of SB 1383 and use of STA Certified Compost & Mulch for stormwater management
- Co-benefits to support cost effective solutions for Counties to meet the procurement requirements while addressing

Stormwater Meet Compost: Leveraging SB 1383

- The intersection of SB 1383 and use of STA Certified Compost & Mulch

- Need for market development for compost & mulch
- Diversion is required for jurisdictions
- Free compost & mulch to count for diversion

- Jurisdictions responsible for stormwater quality management
- Must comply with National Pollutant Discharge Elimination System (NPDES)

- Creating a symbiotic relationship with SB 1383 and NPDES when compost & mulch are used in stormwater management

Stormwater Meet Compost: Leveraging SB 1383

COMPOST

Improves soil health by adding nutrients

Will improve soil structure allowing air and water to penetrate

Facilities draining and salt removal

Improves root penetration

Creates a more stable, erosion resistant, due to overall plant stability and water absorption

MULCH

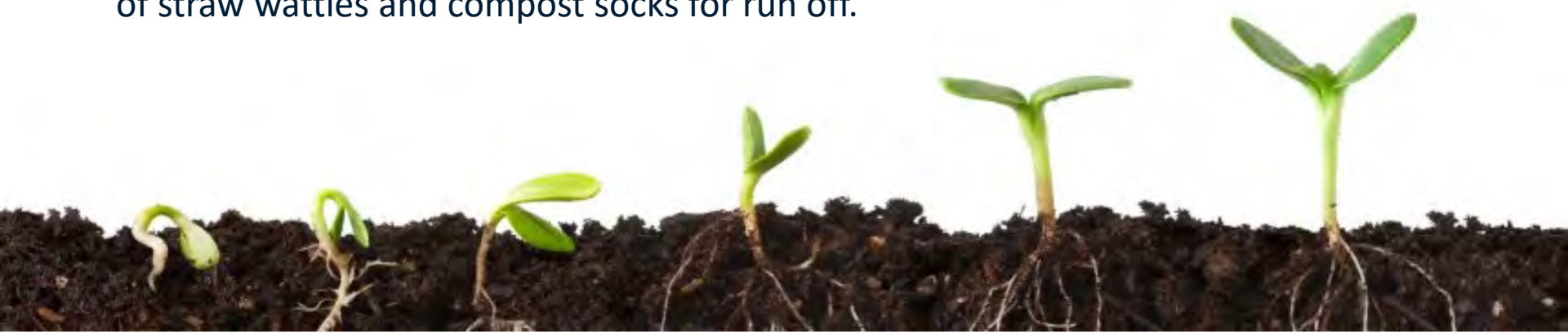
- Conserves water by increasing water retention in the soil.
- Controls weeds depending on thickness of application and stage of maturity.
- Reduce runoff
- Stops erosion
- Remediate wildfires (composted)

Stormwater Meet Compost: Leveraging SB 1383

Compost's use in stormwater management has the ability to improve water infiltration, reduce runoff, and filter pollutants.

Compost can be incorporated into various green infrastructure practices to enhance the over all effectiveness in managing stormwater such as bioswales, rain gardens and compost blankets.

Most recent and notable study with the 2018 Camp Fire, comparison with the use of straw wattles and compost socks for run off.



Stormwater Meet Compost: Leveraging SB 1383

SB1383 Drivers for Circular Economy

- Procurement requirement: permitted facility
- Each Jurisdiction required to meet procurement requirements for "Recovered Organic Waste Products"
  - Compost, Mulch, RNG, Biomass
- SB619 30% by 2023, 60% by 2024 & 100% by 2025

Compliance Activities:

- Jurisdiction Procurement (SB1383)
  - Give away events, Landscapers, free to residents/businesses
- Mandatory Water Efficiency Landscape Ordinance (MWELO)
  - Must enforce compost and mulch requirements & ordinance
- Cal Trans Projects, Public Works, /SOCWA/IRC
- County Procurement – Construction & Contract Language

Environmental Management Categories	Land Use Categories	Systems and Treatments	Sustainable Landscaping & Gardens
• Bioremediation of Contaminated Soil • Carbon Sequestration • Erosion Control • Fire Remediation • Healthy Soils • Stormwater Management-LID & Green Infrastructure • Water conservation	• Agriculture • Riparian • Street & Road Network • Habitat Restoration**	• Biostrips & Bioswales • Compost Blankets • Compost Socks • Engineered Soil • Hydroseed & "Hydromulch" • Mulch • Soil Amendment	• Green/Living Walls • Green Roofs/Rooftop Garden • Rain Gardens/Bioretention Cells • Sustainable Landscaping

Compost Application Resource – Connecting the Dots

CalRecycle

Compost and Mulch Use Toolbox
https://calrecycle.ca.gov/organics/compostmulch/toolbox/

Caltrans

Erosion Control Toolbox: Compost
https://dot.ca.gov/programs/design/lap-erosion-control-design/tool-1-lap-erosion-control-toolbox/tool-1k-11-compost

US Composting Council®

Specifying STA Certified Compost
https://www.compostingcouncil.org/page/SpecifyCompost

Compost Use On State Highway Applications
https://cdn.ymaws.com/www.compostingcouncil.org/resource/resmgr/documents/compost_use/Compost_Use_for_DOT.pdf

UC ANR | UNIVERSITY OF CALIFORNIA Agriculture and Natural Resources

UCANR Fire Network
https://ucanr.edu/sites/fire/Preparedness/Landscaping/Mulch/

US EPA
United States Environmental Protection Agency

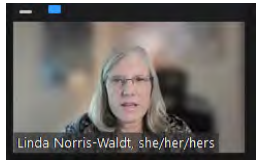
EPA's Compost Use Workshop for Specifications
https://www.youtube.com/watch?v=Kh16RusWNRk

Compost Research & Education Foundation

Compost Use Applications - A Return on Investment (ROI)
https://compostfoundation.org/Return-on-Investment

PFAS and the Compost Industry: US Compost Council

PFAS and the Compost Industry: A 2025 Update
(5/29/25 Webinar)
https://www.compostingcouncil.org/



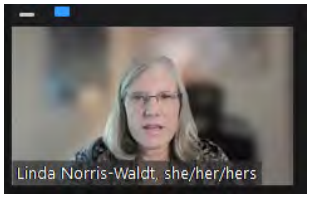
- PFAS legislation & research for 2025 – biosolids and composting
- In Biosolids & Legislation – ubiquitous, not significant source in compost
- PFAS regulations is composting industry – science-based approach
  - "The good, the bad, and the ugly" – Linda Norris-Waldt, USCC Deputy Dir.

Texas: HB1674/S886 – The Ugly
New York: SB5759/A6192 – The Ugly
Vermont: H292 – The Ugly
Oklahoma: HB1726 – The Ugly
Mississippi: SB2249 – The Bad
Connecticut: SB0833 – The Bad
Washington: SB5033 – The Good

Fed: GOP Farm Bill funds for study
EPA Risk Assessment:
Risk Assessment
Risk Assessment Comments

PFAS and the Compost Industry: US Compost Council

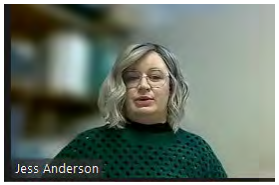
State Reg	Description	Status
Texas: HB1674/s886	Rigid low testing limits, not based in science, 2 strikes you are out - batch is hazardous waste	The Ugly
New York: SB 5759/A6192	5-year moratorium - compost that includes biosolids from WWTP	The Ugly
Vermont: H292	Rules fo testing biosloids in effect 7/1/2025; No landspreading if PFAS detected	The Ugly
Oklahoma: HB1726	Ban on biosolids spreading, selling or distriubution of compost material that contains biosolids	The Ugly
Mississippi: SB2249	Ban on use of spreading for land application sludge, distribution of compost containing biosolids/sludge	The Bad
Conecticut: SB0833	Adopt Maine's approach to all land applicatioin	The Bad
Washington: SB5033	Recognize biosolids are unavoidable by-product of human wastewater treatment process and will increase; PFAS sampling US EPA method 1633 A - science based standard	The Good

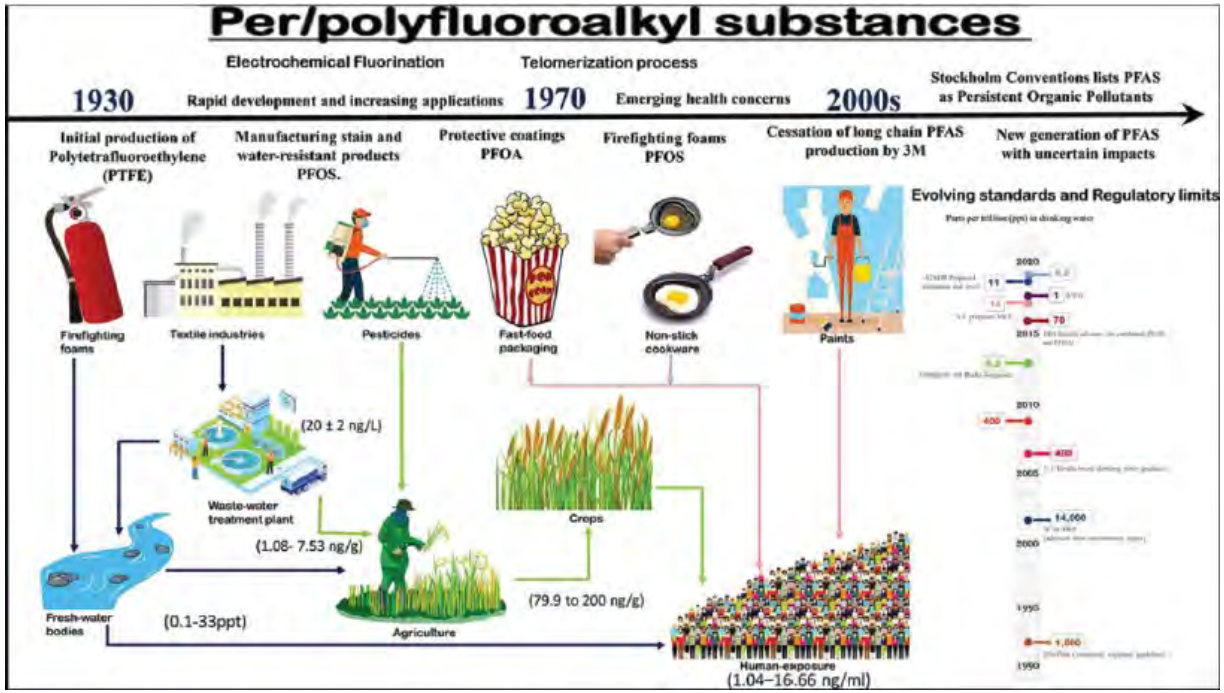


California: AB1201 Labeling of products as "compostable" to have total organic fluorine concentrations below 100ppm - No current specific, numerical limits for PFAS in compost

PFAS and the Compost Industry: US Compost Council

- PFAS contamination & research – overview of synthetic chemicals since 1940





- PFAS variation in compost – variations based on source materials: composted biosolids; green waste; synthetic fertilizers
- PFAS in composting biosolids – no established range or level in compost

PFAS and the Compost Industry: US Compost Council

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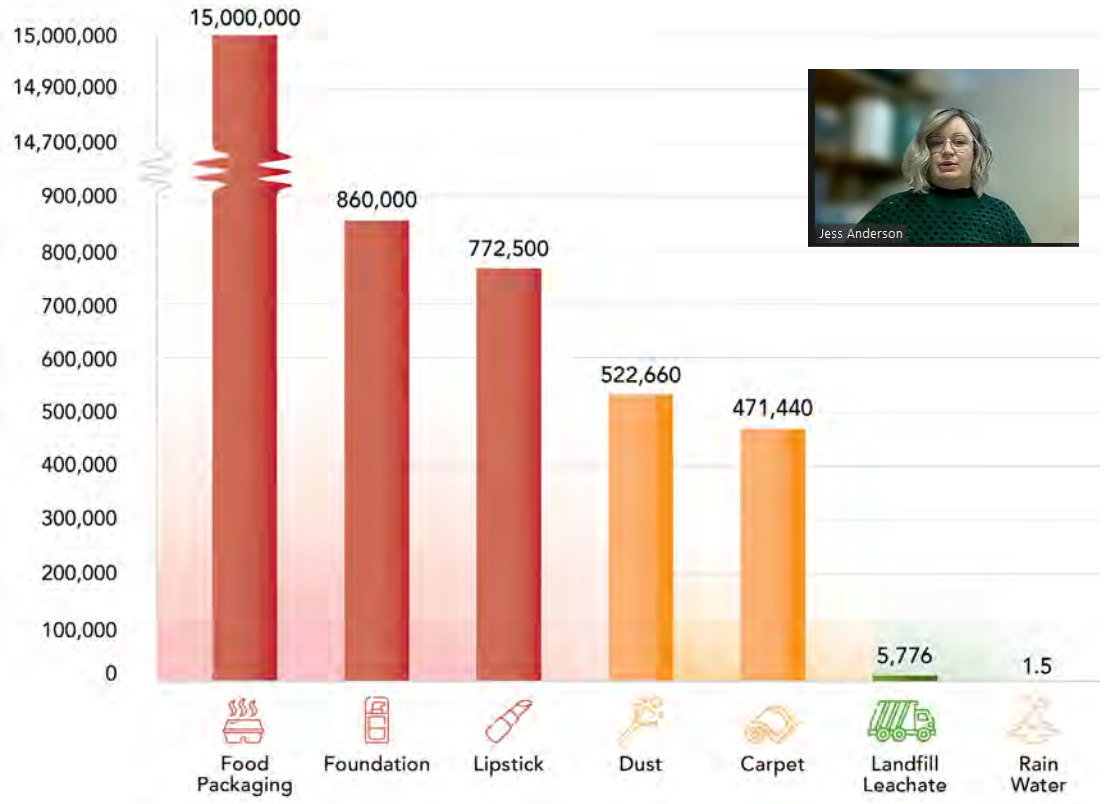


PFOA/PFOS Product Comparison

PFOA/PFOS Product Comparison	PFOA Parts Per Billion	PFOS Parts Per Billion
Microwave popcorn bags[a]	6 - 290	N/A
Cosmetic concealer[b]	2,335.0	ND
Furniture, apparel (max)[c]	22.5	2.1
Dental floss[a]	3.0	N/A
Body lotion[b]	3.5	ND
US household dust (2001)[d]	142.0	201.0
Soil background levels (VT 2019)[e]	0.5	1.0
US human blood serum levels (1999-2000)[f]	5.2	30.4
US human blood serum levels (2017-2018)[f]	1.4	4.3
Yard waste bags[g]	0.8	0.2
US food waste compost[h]	4.7	1.7
US compost w/o food waste[h]	0.3	1.9
ME, NH & VT biosolids compost[i]	12.0	8.7

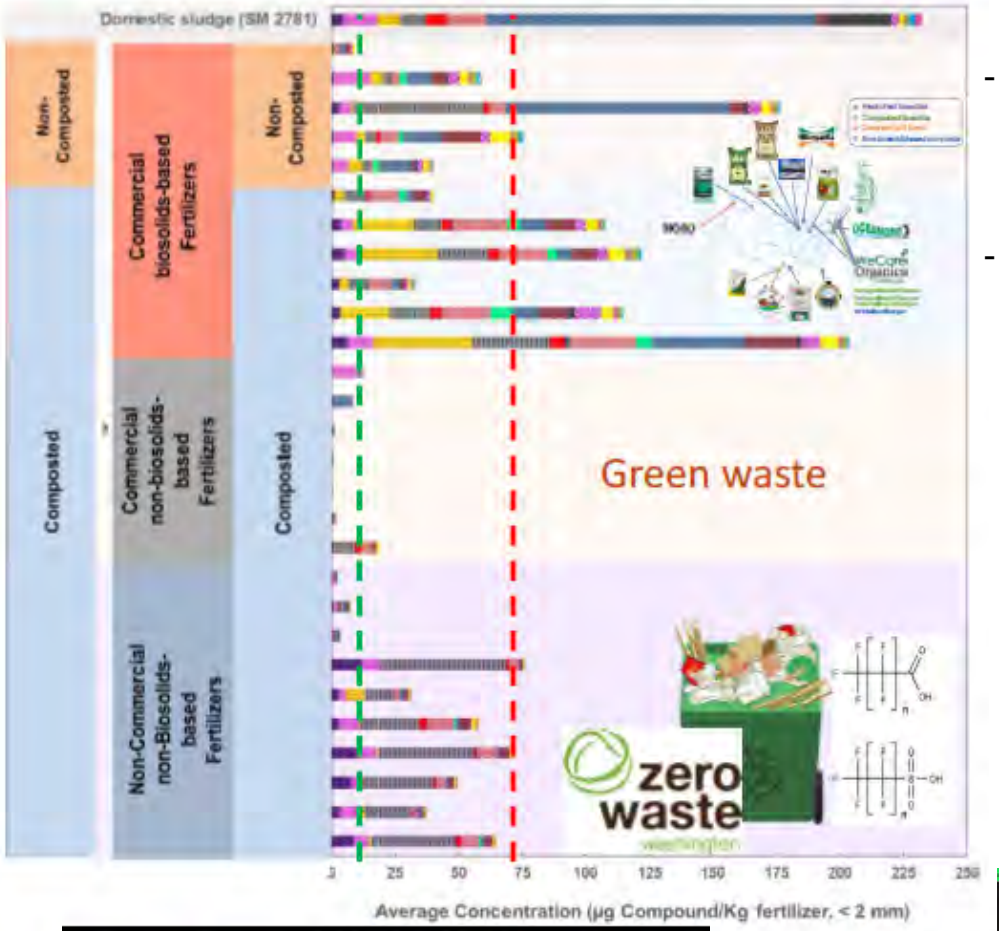
For citations, go to QR code

US Composting Council

Jess Anderson

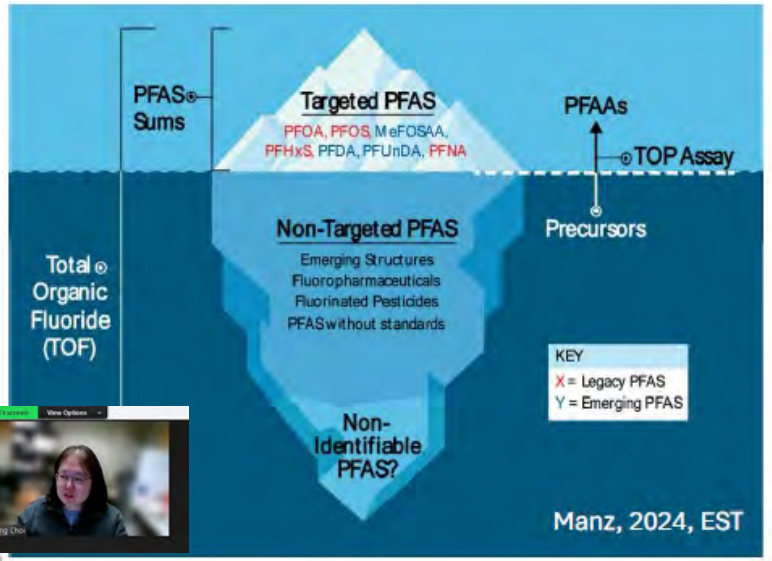
PFAS and the Compost Industry: US Compost Council

Source of compost



- PFAS in composting biosolids – no established range or level in compost
- PFAS in compost products – due to various products: food containers, cosmetics, carpets, with food containers as a significant source (Purdue University)
- PFAS in compostable packing regulations – restrictions placed on manufactures and protection for passive receivers

Dark matter: beyond quantification



PURDUE UNIVERSITY | Agronomy

Youn Jeong Choi

PFAS and the Compost Industry: US Compost Council

Key Take Aways

- PFAS is everywhere and difficult to contain and clean up

- PFAS although its ubiquitous, high concentrations found:
  - Community Water Facilities, Wastewater Plants, Landfills, Military Bases, Agriculture Land, Consumer Products/Manufacturing
  - Passive receivers: Community Water Facilities, Wastewater Plants, Landfills
  - PFAS Map: https://www.ewg.org/interactive-maps/pfas_contamination/map/

- EPA to work on exception from CERCLA – **PFAS bills going to State Level**
  - "When the fed puts down their pen, the state picks theirs up"

- PFAS does not create a concern in compost due to the trace amounts and have not presented any health issues in compost or shown any.

PFAS and the Compost Industry: US Compost Council

Sources Provided by US Compost Council – Jess Anderson

U.S. Food and Drug Administration. (n.d.). *Per- and polyfluoroalkyl substances (PFAS)*. U.S. Department of Health and Human Services. https://www.fda.gov/food/environmental-contaminants-food/and-polyfluoroalkyl-substances-pfas

U.S. Environmental Protection Agency. (n.d.). *Remediation technologies for per- and polyfluoroalkyl substances (PFAS)*. CLU-IN. https://clu-in.org/contaminantfocus/default.focus/sec/Per-_and_Polyfluoroalkyl_Substances_(PFAS)/cat/Remediation_Technologies/

U.S. Environmental Protection Agency. (n.d.). *Research on per- and polyfluoroalkyl substances (PFAS)*. https://www.epa.gov/chemical-research/research-and-polyfluoroalkyl-substances-pfas

Abunada, Z., Alazaiza, M. Y. D., & Bashir, M. J. K. (2020). An Overview of Per- and Polyfluoroalkyl Substances (PFAS) in the Environment: Source, Fate, Risk and Regulations. *Water*, *12*(12), 3590. https://doi.org/10.3390/w12123590

Abunada, Z.; Alazaiza, M.Y.D.; Bashir, M.J.K. An Overview of Per- and Polyfluoroalkyl Substances (PFAS) in the Environment: Source, Fate, Risk and Regulations. *Water* **2020**, *12*, 3590. https://doi.org/10.3390/w12123590

Kurwadkar, S., Dane, J., Kanel, S. R., Nadagouda, M. N., Cawdrey, R. W., Ambade, B., Struckhoff, G. C., & Wilkin, R. T. (2022). Per- and polyfluoroalkyl substances in water and wastewater: A critical review of their global occurrence and distribution. *Science of the Total Environment*, 809, 151003. https://doi.org/10.1016/j.scitotenv.2021.151003

Salvatore, D., Mok, K., Garrett, K. K., Poudrier, G., Brown, P., Birnbaum, L. S., Goldenman, G., Miller, M. F., Patton, S., Poehlein, M., Varshavsky, J., & Cordner, A. (2022). Presumptive contamination: A new approach to PFAS contamination based on likely sources. *Environmental Science & Technology Letters, 9*(11), 983–990. https://doi.org/10.1021/acs.estlett.2c00502

Valve World Americas. (2024, March 25). Not all “PFAS” chemicals are the same – in fact – most are not. *Valve World Americas*. https://valve-world-americas.com/not-all-pfas-chemicals-are-the-same-in-fact-most-are-not/

US Composting Council. (n.d.). *PFAS pocket cards*. https://www.compostingcouncil.org/store/viewproduct.aspx?id=22574484

Understanding Gasification for PFAS Removal: Water Research Foundation (WRF)

THE Water Research FOUNDATION®

Understanding Gasification for PFAS Removal

(5/29/25 Webinar)

Homepage | The Water Research Foundation

The Webinar provides greater detail on the treatment of PFAS in Biosolids, identifying the overall effectiveness of advanced thermal treatment technologies.

Specifically, gasification and pyrolysis used to destroy PFAS compounds in wastewater solids processing

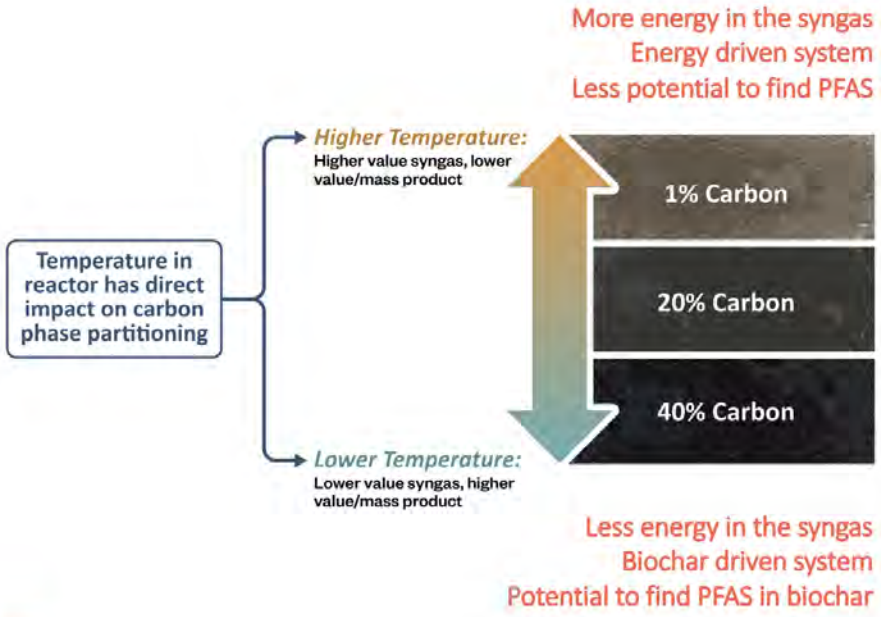
Understanding Gasification for PFAS Removal: WRF

Technology	Process Description	Temperature	Oxygen Use	Main Outputs	PFAS Removal Efficiency	Best Use Case
Gasification	Partial oxidation of biosolids to produce syngas and inert ash	High (>1000°C)	Limited (~30%)	Syngas, inert sand/ash	High	Energy recovery with minimal residual carbon[1]
Pyrolysis	Thermal decomposition in absence of oxygen	Moderate to High	None	Biochar, syngas, tar	Moderate (needs RTO)	Biochar production for reuse[1]
Thermal Oxidation (RTO)	Complete combustion of gases to destroy residual PFAS	Very High	Full	Clean air	Very High (~99.9%)	Air emission control post-gasification/pyrolysis[1]
Granular Activated Carbon	Adsorption of PFAS from scrubber water	Ambient	N/A	Clean water, spent GAC	High (~90%)	Water treatment; GAC can be reused as fuel[1]

Understanding Gasification for PFAS Removal: WRF

Practical Considerations

- Four main processes
  - Drying
  - Process itself
  - Thermal oxidation
  - Air treatment
- No difference between pyrolysis and gasification facilities.
- NO tar generated from these facilities
- Differences are among vendors
  - Recycling material within the process
  - Operating temperature either within the process or in the thermal oxidation
- Outputs
  - Biochar/inert: mostly little to no PFAS temp dependent
  - Air/exhaust: has low PFAS, what is acceptable in future?
  - Blowdown/scrubber water: has PFAS, but easy to remove



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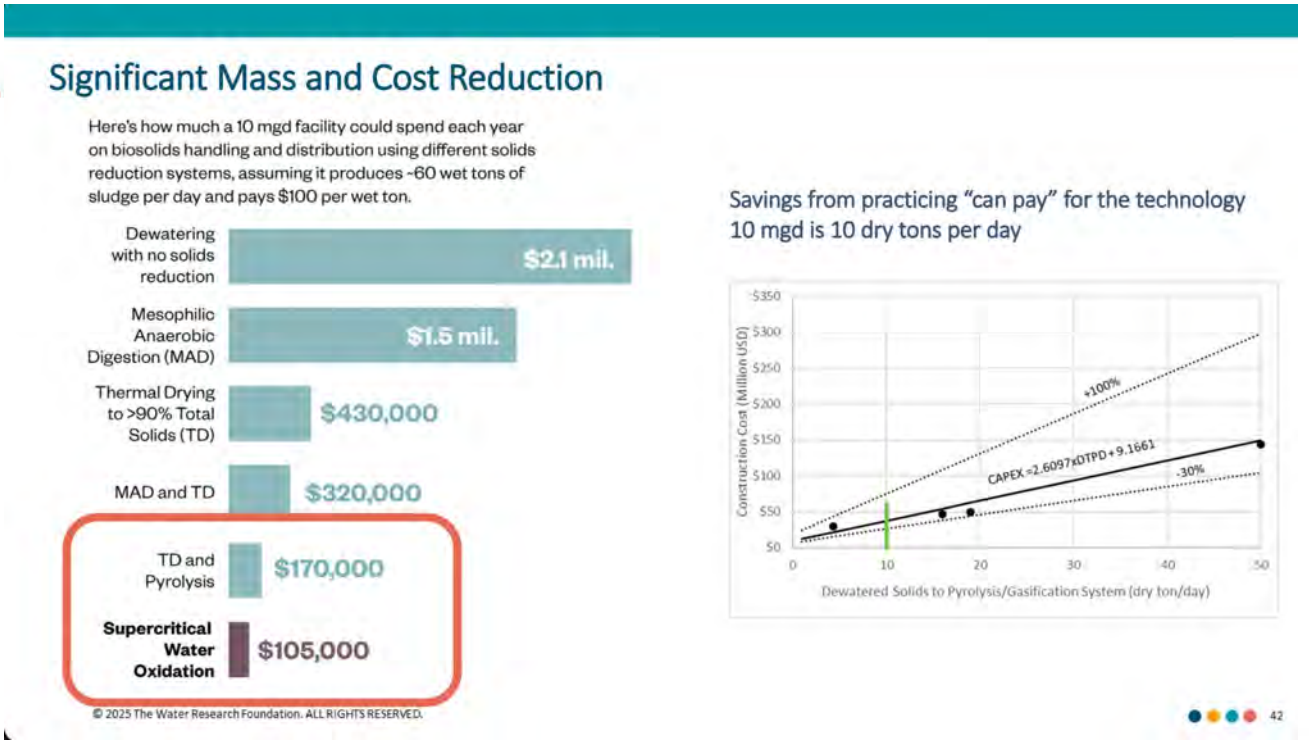
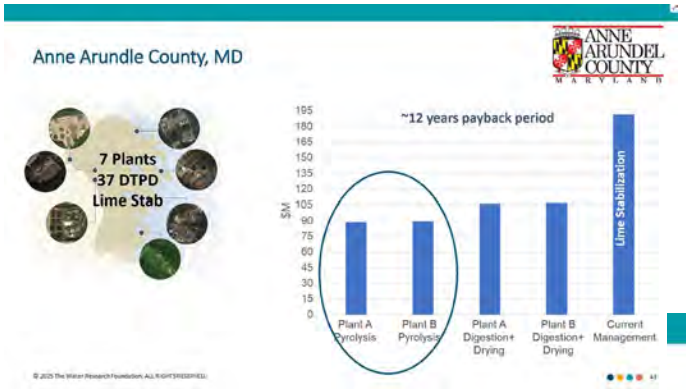
Understanding Gasification for PFAS Removal: WRF



Understanding Gasification for PFAS Removal: WRF



Take Home Messages

- Start planning process for what to do and what to change, if not started
- Start measuring PFAS in biosolids and influent
- Start finding sources of PFAS and work on source control
- Gasification/pyrolysis are emerging
  - Can remove PFAS, trade off between biochar and inert
  - Need more full-scale data points on diff sludges and technologies
  - Will there be requirement for PFAS in air emission?
  - Air emission is mainly from drying process
- PFAS removal technologies significantly reduces mass and volume
- Technologies to remove PFAS can be cost effective

Understanding Gasification for PFAS Removal: WRF

Key Take Aways

Considering the next wave of cost associated with biosolids treatment for PFAS destruction, similar to Landfilling Operations, Wastewater Treatment Plants are passive receivers, and further technology will be needed to address biosolids quality for land application either Class A or B, or biochar.

The quality of the bio-char results in PFAS destruction and creating another feedstock for composting operations to homogenize into a product for land application.

Biochar acts like activated carbon and can be used as soil amendment or as potential use in remediation and can be used in mixing cement in concrete.

Essential Public Service: Rule 1302

Essential Public Service: Rule 1302 and Other Air Quality Issues (Updating regulatory definition to align with reason)

- Emissions Reduction Credits (ERC's) are being required for composting facilities, increasing costs and permitting delays
  - Windrow and Covered Aerated Static Piles (CASP)

- Amend rule to reflect support for current requirements on organics waste diversion

- Incorporate "organics waste processing facilities" as part of the definition

- Ensure Transparent and Defensible Emissions Factors

Questions & Therapy Session