Characterization and Management of PFAS Remediation Residuals

Motivation: More research is need to make informed decisions on the best management strategies for remediation wastes.

Description: An evaluation of PFAS leaching from contaminated soils and liquid PFAS wastes mixed with different absorbent bulking agents.

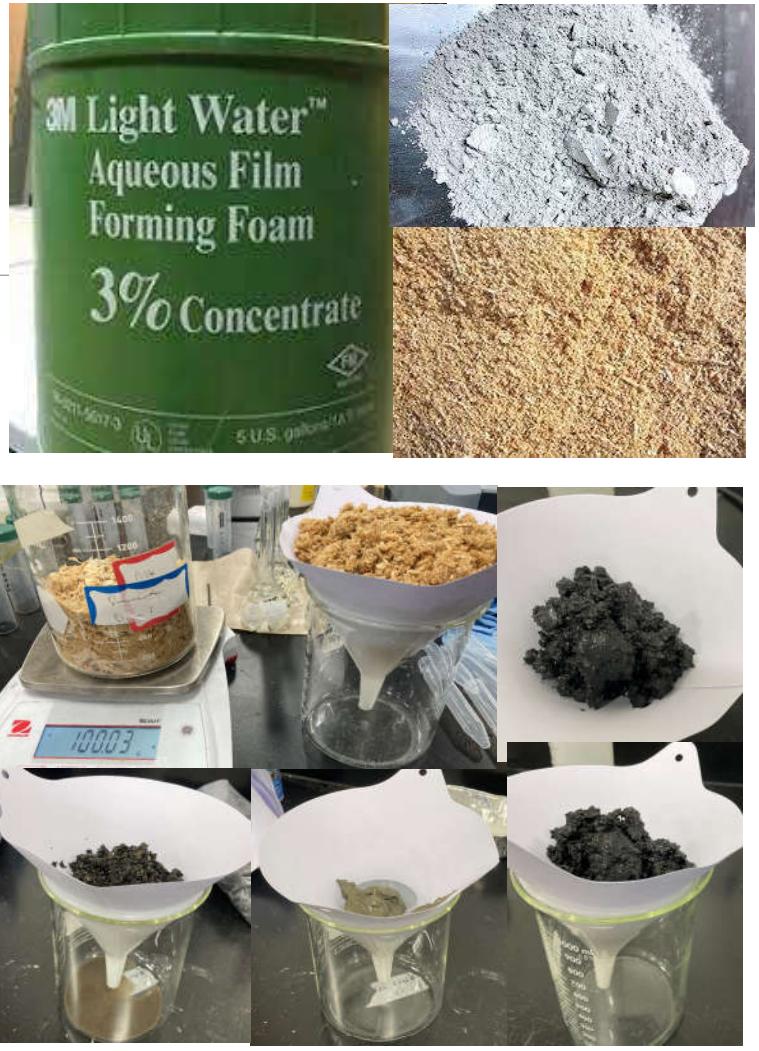
Contaminated Soil

- With provisional soil cleanup target levels developed it is important to understand leachable fraction of PFAS in contaminated soils
  - PFOA 1.3 mg/kg residential or 0.002mg/kg leachability
  - PFOS 1.3 mg/kg residential or 0.007 mg/kg leachability
- Batch leaching tests (LEAF Methods 1313/1316) to help determine leachability of PFAS in soil

Liquid Wastes

Motivation: How to best manage PFAS contaminated liquid wastes?

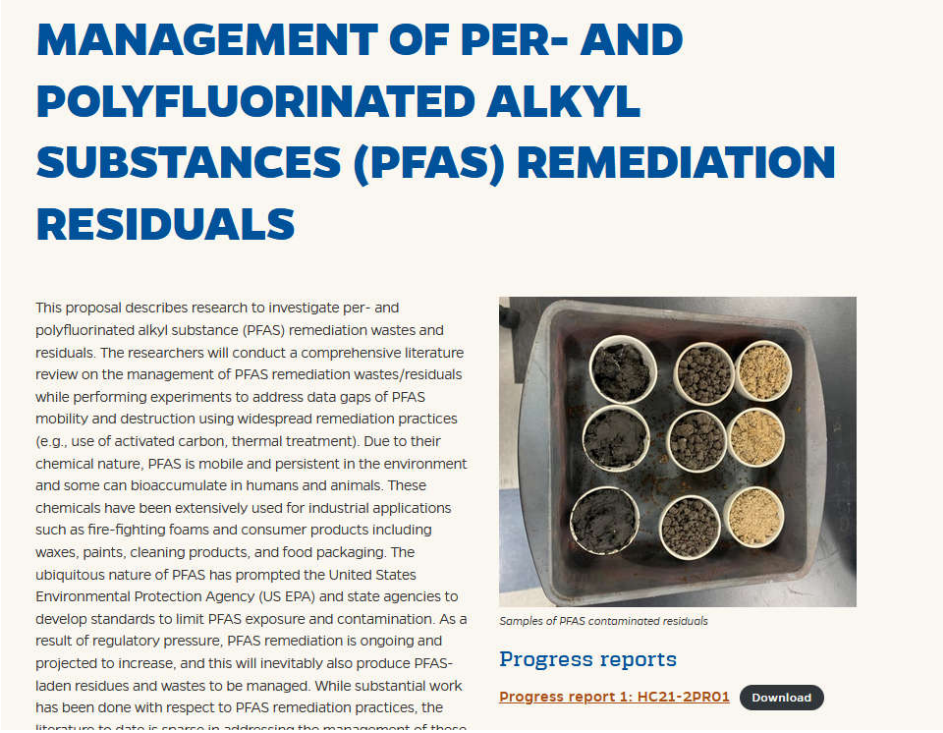
- It is common to bulk liquid wastes with adsorbent materials to stabilize free water - free liquids can not be disposed of in a landfill
- Our team has stabilized/bulked synthetic PFAS wastewater and remediation wastewater using different materials
- Currently running leaching test (TCLP/1316) to determine leachability of bulked PFAS liquid wastes in a landfill setting



Additional Information About This Project

This project is on track to be completed by April 2022

If you want to learn more about this project you can visit our website at: https://faculty.eng.ufl.edu/timothy-townsend/characterization-and-management-of-per-and-polyfluorinated-alkyl-substances-pfas-remediation-residuals/



MANAGEMENT OF PER- AND POLYFLUORINATED ALKYL SUBSTANCES (PFAS) REMEDIATION RESIDUALS

This proposal describes research to investigate per- and polyfluorinated alkyl substance (PFAS) remediation wastes and residuals. The researchers will conduct a comprehensive literature review on the management of PFAS remediation wastes/residuals while performing experiments to address data gaps of PFAS mobility and destruction using widespread remediation practices (e.g., use of activated carbon, thermal treatment). Due to their chemical nature, PFAS is mobile and persistent in the environment and some can bioaccumulate in humans and animals. These chemicals have been extensively used for industrial applications such as fire-fighting foams and consumer products including waxes, paints, cleaning products, and food packaging. The ubiquitous nature of PFAS has prompted the United States Environmental Protection Agency (US EPA) and state agencies to develop standards to limit PFAS exposure and contamination. As a result of regulatory pressure, PFAS remediation is ongoing and projected to increase, and this will inevitably also produce PFAS-laden residues and wastes to be managed. While substantial work has been done with respect to PFAS remediation practices, the

Samples of PFAS contaminated residuals

Progress reports

Progress report 1: HC21-2PR01 Download

PFAS in Municipal Public Works Waste Streams

Motivation: More research is needed to inform best management strategies for waste streams generated by public works programs.

Description: Characterize PFAS in waste streams generated by municipal public works (water treatment, street sweeping, etc.)

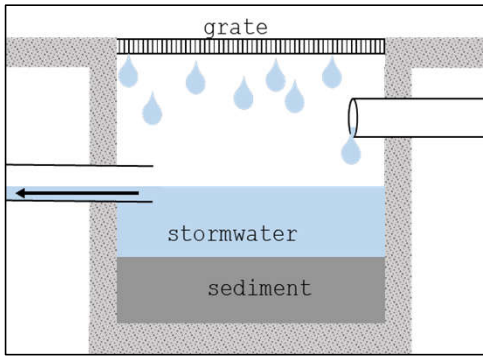
PFAS and Beneficial Use

- Beneficial use is the recycling of waste materials rather than disposal in a landfill
- FDEP provides beneficial use guidelines which help ensure these wastes do not cause ground or surface water contamination
- Public work wastes streams like street sweepings, catch basin sediments, and RSM from C&D recycling facilities have established beneficial use guidelines <u>but have no regulations for PFAS</u>

Reuse road made with recycled WTE ash

Street Sweepings and Catch Basin Sediment

- UF study has identified PFAS in street sweepings collected across Florida
- Plan to investigate differences in street sweepings and catch basin sediments based on traffic levels, zoning, time of year and relative abundance of non-organic litter
- Commonly reused as construction fill or landfill cover



Ahmadireskety, A., Da Silva, B. F., Robey, N.M., Douglas, T., Aufmuth, J., Solo-Gabriele, H. M., Yost, R. A., Townsend, T. G., & Bowden, J. A. Per- and Polyfluoroalkyl Substances (PFAS) in Street Sweepings. Accepted by *Environmental Science and Technology*.

Drinking Water Treatment Sludge

- Limited research on PFAS concentrations in this waste stream
- Our team wants to identify if drinking water treatment sludge is a possible sink for PFAS
- Drinking water treatment sludge can be used in agriculture as a soil conditioner

C&D Recovered Screen Material (RSM)

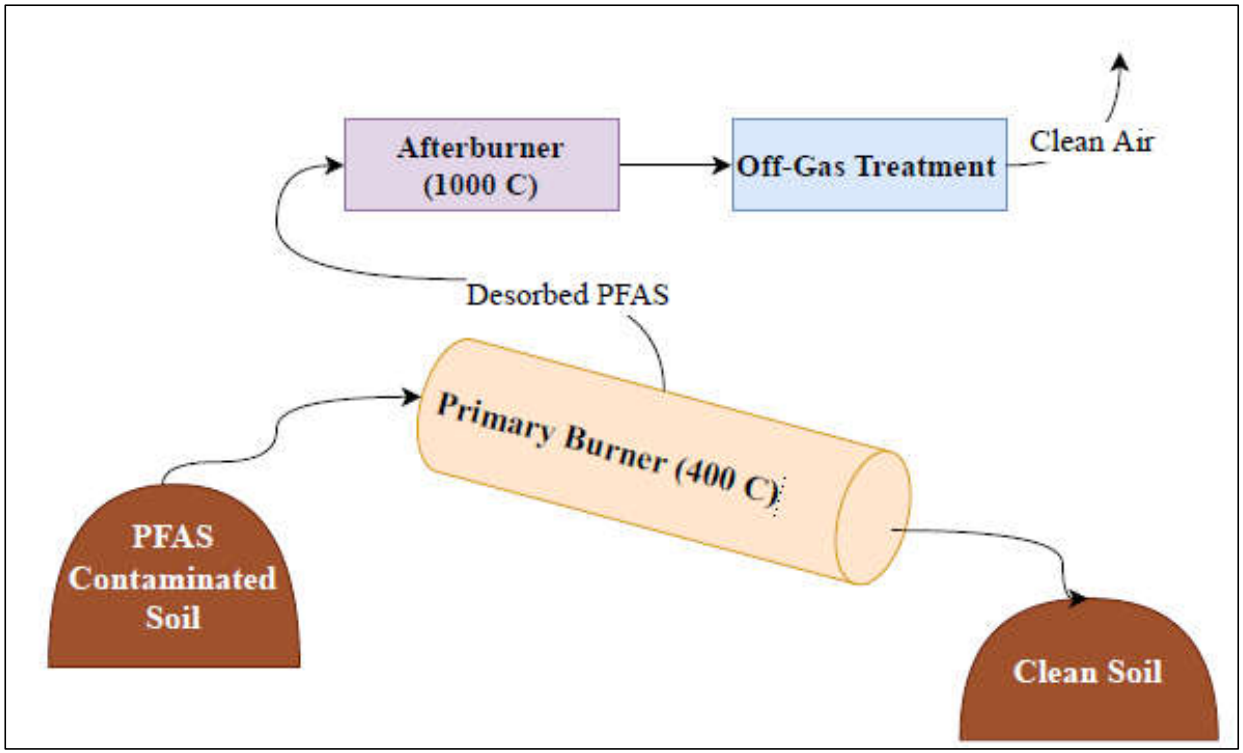
- C&D RSM is not often targeted for PFAS research even though, components of the C&D debris waste stream often contain PFAS
- Plan to investigate variations in RSM between MRFs using different operation and segregation strategies
- Commonly reused as daily landfill cover

Biosolids

- PFAS in biosolids is well characterized but there is limited research on how management strategies effect PFAS transformation and destruction
- Biosolids are managed in diverse ways (e.g., drying, heating, biological treatment, composting), but the impacts of each of these management strategies on PFAS contamination are not well understood
- Our team has developed an extraction method for determining total PFAS in biosolids
- Plan to investigate the leachable fraction of PFAS in biosolids through batch leaching tests

Full Scale Thermal Treatment of PFAS Contaminated Soil

- Existing pilot scale research is limited in terms of PFAS species examined and understanding potential transformations that occur with volatilization/ thermal destruction of PFAS
- Our team intends to investigate these gaps in knowledge by retrofitting a traditional soil treatment plant for PFAS monitoring throughout the pyrolysis process.



Thank You!