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February 8, 2022

Ms. Ariana Sutton-Grier
Office of Management and Budget
Office of Information & Regulatory Affairs
1100 G Street, NW
Washington, DC 20005

Re: PFAS Management Costs for Municipal Solid Waste Landfills

Dear Ms. Sutton-Grier:

Thank you for the opportunity to meet with your office on February 7, 2022, to discuss the potential impacts on the solid waste sector of EPA's proposed rule designating PFOA and PFOS as CERCLA hazardous substances (RIN: 2050-AH09). The National Waste & Recycling Association (NWRA) is a trade association representing the private sector waste and recycling industry. Our members operate in all fifty states and the District of Columbia. Also present during the meeting were some of our members and representatives from the Solid Waste Association of North America (SWANA). SWANA is a not-for-profit professional association in the solid waste field with more than 10,000 members in both the private and public sectors across North America.

In response to your request for information on the economic impact of the rule to our sector, we have provided the following cost estimates and information. As we discussed at our meeting, the designation of PFOA and PFOS as hazardous substances under CERCLA will likely have unintended consequences that undercut the Administration's broader environmental goals. We ask that OIRA account for these realities, as well as the significant economic impact of the rule on innocent essential public services and their customers, as it considers the draft proposed rule. The municipal solid waste industry continues to strongly support the goals of addressing PFAS contamination and holding accountable those entities that are responsible for the compounds through their manufacture and/or use.

The municipal solid waste industry is unaware of any full-scale commercially proven PFAS treatment destruction technologies for landfill leachate. Existing technologies have been deployed to remove, but not destroy, PFAS, including reverse osmosis and granular activated carbon. These technologies currently are available to landfills and wastewater treatment facilities but require significant wastewater pretreatment before PFAS removal can be achieved. It is also important to highlight that there are notable differences in the use of treatment technologies for PFAS removal at landfills versus wastewater treatment facilities.

Since most landfills do not employ leachate pretreatment, PFAS removal requires the development of a multi-step process including (1) pretreatment to address non-PFAS constituents, (2) subsequent PFAS removal technology, and (3) PFAS residuals treatment/management. From an economic perspective, leachate pretreatment and PFAS residuals management will add significantly to the costs of landfill operation.

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The estimated capital cost to implement leachate pretreatment to the extent necessary to remove PFAS is approximately \$2 to \$7 million to provide complete, multi-step biological treatment of 30,000 to 40,000 gallons per day of leachate, representing a moderate sized landfill. Included in this cost estimate is approximately \$0.5 to \$1.5 million for PFAS removal technology, with additional costs anticipated for landfills where more stringent effluent levels are desired/mandated.

Moreover, since these technologies are unable to destroy PFAS, further management of the residual PFAS waste streams is needed to stabilize or otherwise limit their ability to reenter leachate. The costs and operational effectiveness for PFAS residuals management is less understood as most technologies have not been evaluated at full-scale. Based on general conversations with technology developers and estimates/extrapolations from small-scale studies, however, the municipal solid waste industry anticipates that implementing new technologies for PFAS removal and subsequent residuals management could increase the costs of treating landfill leachate by approximately \$0.06 to \$0.39 (potentially even higher) per gallon of raw leachate processed (i.e., a cost increase of at least 400% to 800%) (see Appendix). Based on an estimated 16.1 billion gallons of leachate per year generated in the United States (see pg. 68 of EPA's [Interim Guidance on the Destruction and Disposal of PFAS and PFAS-Containing Materials](#)), **increased costs associated with PFAS management could total approximately \$966 million to \$6.279 billion per year for municipal solid waste landfills.**

We appreciate the opportunity to provide these additional comments, and we look forward to working with you as you continue to review the proposed rule. If you have any questions, please feel free to contact Anne Germain at agermain@wasterecycling.org or 302-270-5483.

Very truly yours,



Darrell K. Smith
President & CEO

Appendix. Cost Summary of Review of Conceptual Leachate Treatment Scoping Study New England Waste Services of Vermont (NEWSVT) Coventry, Vermont

The State of Vermont requested Civil & Environmental Consultants, Inc. (CEC), to prepare an independent evaluation of several alternative management and technology approaches for managing PFAS in the landfill leachate at the NEWSVT landfill in Coventry, Vermont. This is the only currently operating disposal facility in the state. CEC based its review on previous project experience and vendor quotes. The approaches in these alternatives included hauling to municipal wastewater resource recovery facilities (WWRFs), pretreatment to reduce the PFAS load in the hauled leachate, and various treatment options for surface water disposal. The treatment and disposal cost opinions at the WWRFs did not include the costs to the WWRFs for managing the PFAS in their effluent. These treatment costs do not include residuals management.

The overall alternative cost opinions presented below (based on CY 2020 costs) to be anticipated for a landfill generating 50,000 gallons per day (GPD) for a present worth cost range, including capital and life cycle operation and maintenance, ranged from \$26 million to \$95 million. The recommended alternative (Alternative 1A-2) involved a capital cost expenditure of \$15.5 million and an annual cost of almost \$1 million. The opinion of total annual cost for PFAS management for operation and maintenance and capital recovery over a 20-year bond repayment is \$2.3 million for the 50,000 GPD leachate flow.

Alternative 1A-2 represents the lowest cost of the options reviewed. Costs for other options ranged as high as \$8.3 million. In addition, these costs don't reflect other potential risks associated with managing leachate if POTWs cut off acceptance post-CERCLA regulation.

Option	Annualized costs (millions)
1a	\$2.4
1a-2	\$2.3
1a-3	\$2.9
3a	\$8.3
2a	\$3.2
2d	\$3.8
4a	\$2.7
4b	\$3.1

The life cycle cost opinions for the alternatives evaluated, including capital and annual operation and maintenance costs, ranged from \$0.07 per gallon for hauling and disposal at WWRFs to over \$0.41 per gallon for advanced multistage leachate treatment. The alternative recommended (Alternative 1A-2) included reverse osmosis treatment followed by a residuals evaporator to reduce the volume in the reverse osmosis reject flow from 15% to 3% of the leachate flow. Other related costs were not included, as the technology was not sufficiently developed at the report date.

Although this evaluation was based on a specific flow with specific site conditions, smaller plants may experience a higher cost per gallon, while larger plants may experience a smaller cost per gallon. The full text of the report is located at:
<https://anrweb.vt.gov/PubDocs/DEC/PFAS/Studies/Report-CEC-Review-of-BC-Conceptual-Study-6-15-2021.pdf>

Table 3. Cost Opinions

NEWSVT PFAS Landfill Leachate Treatment System - Cost Summary												
Technology	CAPEX Range			OPEX	Treatment System Life Cycle Cost - Present Worth	Mid opinion annual Capital Recovery Factor (CRF) = 0.087185	Combined Annualized Cost, CRF + OPEX	Treatment Cost/Gal	Annual Transport & Disposal (T&D)	Total Annual Treatment and Hauling/Disposal Cost	Present Worth Treatment System and T&D	Overall Cost/Gallon
	Low CAPEX Less 20%	Mid - Opinion	High CAPEX Plus 100%									
No Action	0	0	0	\$0	0	0	0	0	\$1,572,000	\$1,572,000.00	\$18,030,840	\$0.07
Option 1a On-Site: Discharge to Surface Water	\$13,163,000	\$16,454,000	\$32,908,000	\$961,000	\$27,500,000	\$1,435,000	\$2,396,000	\$0.1313	\$0	\$2,396,000	\$27,482,120	\$0.1313
Option 1a-2 CEC Revision On-Site: Discharge to Surface Water	\$12,354,000	\$15,443,000	\$30,886,000	\$921,000	\$26,000,000	\$1,346,000	\$2,267,000	\$0.1242	\$0	\$2,267,000	\$26,002,490	\$0.1242
Option 1a-3 HTX CEC Revision On-Site: Discharge to Surface Water	\$2,152,000	\$2,690,000	\$5,380,000	\$2,640,000	\$33,000,000	\$235,000	\$2,875,000	\$0.1575	\$0	\$2,875,000	\$32,976,250	\$0.1575
Option 3a On-Site: Zero Liquid Discharge (ZLD)	\$10,927,000	\$13,659,000	\$27,318,000	\$7,142,000	\$95,600,000	\$1,191,000	\$8,333,000	\$0.4566	\$0	\$8,333,000	\$95,579,510	\$0.4566
Option 2a Off-Site: Pretreatment at POTW (50% Reduction)	\$7,140,000	\$8,925,000	\$17,850,000	\$835,000	\$18,500,000	\$778,000	\$1,613,000	\$0.0884	\$1,572,000	\$3,185,000	\$36,531,950	\$0.1745
Option 2d Offsite HTX Pretreatment at POTW/NEWSVT (50% Reduction)	\$2,381,000	\$2,976,000	\$5,952,000	\$2,001,000	\$25,900,000	\$259,000	\$2,260,000	\$0.1238	\$1,572,001	\$3,832,001	\$43,953,051	\$0.2100
Option 4a -Off-Site: POTW Enhancements Newport	\$5,031,000	\$6,289,000	\$12,578,000	\$954,000	\$17,200,000	\$548,000	\$1,502,000	\$0.0823	\$1,154,000	\$2,656,000	\$30,464,320	\$0.1455
Option 4b - Off-Site: POTW Enhancements Montpelier	\$4,645,000	\$5,806,000	\$11,612,000	\$1,085,000	\$18,300,000	\$506,000	\$1,591,000	\$0.0872	\$1,572,000	\$3,163,000	\$36,279,610	\$0.1733

From [Review of Conceptual Leachate Treatment Scoping Study New England Waste Services of Vermont \(NEWSVT\) Coventry, Vermont](#) (p. 19)