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January 22, 2021

VIA E-MAIL ONLY

Irina Makarow
Department of Ecology
P.O. Box 47600
Olympia, WA 98504-7600

ChemActionPlans@ecy.wa.gov

**RE: Comments on Washington State Department of Ecology's
Per- and Polyfluoroalkyl Substances (PFAS) Draft Chemical Action Plan**

Dear Ms. Makarow:

On behalf of Waste Management of Washington, Inc. (WMW), I am submitting the following comments on the Department of Ecology's (Ecology's) *Per- and Polyfluoroalkyl Substances (PFAS) Draft Chemical Action Plan (CAP)*. WMW provides solid waste collection, recycling, management, and disposal services to hundreds of thousands of residents and businesses in Washington State, including solid waste disposal services at its two operating landfills in the state. In addition, Waste Management owns and/or operates several hundred landfills throughout the United States and Canada, including one hazardous waste landfill and several other non-hazardous waste landfills in the Pacific Northwest.

WMW commends Ecology for the focus and detail contained in the CAP. In particular, WMW strongly supports Ecology's focus on addressing PFAS contamination in drinking water and the urgent need to reduce or eliminate the use of certain PFAS in common household and consumer products. Waste Management (including WMW) is closely following and participating in federal and state efforts to address the emerging issue of PFAS contamination and how to best manage those materials. As a recognized industry leader WMW would like to take this opportunity to extend an open invitation to have meaningful discussions with the Ecology on PFAS management. WMW is keenly interested in the development and implementation of the CAP and requests that Ecology consider the following comments on the proper disposal and destruction of PFAS and PFAS-contaminated materials.

WMW also notes that the CAP was developed prior to EPA's recently issued draft *Interim Guidance on the Destruction and Disposal of Perfluoroalkyl and Polyfluoroalkyl Substances and Materials Containing Perfluoroalkyl and Polyfluoroalkyl Substances* ("Draft Interim Guidance").¹ As this draft was released well after the CAP, WMW also recommends

¹ See *Interim PFAS Destruction and Disposal Guidance; Notice of Availability for Public Comment*, 85 Fed. Reg. 83,554 (Dec. 22, 2020).

that Ecology update the CAP to reflect some of the important studies, findings, and recommendations from the Draft Interim Guidance, as discussed below.

Comment 1. Ecology should coordinate more closely with the solid and hazardous waste landfill industry in developing and implementing the CAP.

WMW appreciates the work of Ecology and its external advisory committee in the development of the CAP, it seems however that Ecology has not included representatives from the solid and hazardous waste landfill industry in this process. WMW encourages Ecology to take additional steps to seek industry participation in future work.

For any action plan to be comprehensive, it must address how PFAS wastes will be managed once they are taken out of circulation, filtered out of our water supplies, or dug up out of the ground. Identifying available, feasible, and environmentally protective disposal alternatives is necessary to PFAS management under the CAP. As Ecology has already recognized for its stockpiles of aqueous fire-fighting foams (AFFF), it is not enough simply to stop using products containing certain PFAS compounds; understanding proper disposal of those unused materials is also necessary. Similar problems will arise for many other materials. Banning PFAS in ski waxes, cosmetics, textiles, and other consumer products will require assessing appropriate solid waste – and potentially dangerous waste – disposal alternatives. The waste disposal industry is an obvious partner in developing sound recommendations.

Conferring with the landfill industry to gain a better understanding of how landfills are designed and managed to protect public health and the environment from exposure to the many contaminants that are present in the waste stream is important. In addition to the engineering and environmental controls implemented at Subtitle C and D facilities, other factors such as environmental setting of the individual facility are also important factors in determining the suitability of an individual facility to manage these compounds. All landfills are not the same, and factors such as the type of landfill (*e.g.*, unlined landfills, construction and demolition waste landfills, municipal solid waste (MSW) landfills, etc.), the climatic setting, leachate management (on-site or offsite), and if the facility produces landfill gas and how it is managed are all important factors in determining a particular facility's ability to manage these wastes in a protective manner. Our industry has been active in leading efforts to control releases of PFAS waste to protect human health and the environment, WMW thus requests and encourages Ecology to include WMW and other key solid and hazardous waste industry stakeholders in further development and implementation of the CAP.

Comment 2. The CAP must address the inter-relatedness of landfills and wastewater treatment plants.

It is important for Ecology to recognize that many landfills either produce no leachate or operate as closed-loop systems that recirculate or evaporate any leachate that is generated. Nevertheless, many other landfills send leachate off-site for treatment. This latter category of facilities, and the wastewater treatment plants (WWTPs) that receive their leachate as influent, are and will be challenged to manage PFAS in wastewater and biosolids that neither sector was responsible for creating. Landfills and WWTPs do not make PFAS and do not use PFAS. Rather, they are burdened with managing PFAS contamination generated by millions of industrial, commercial, and residential generators of PFAS waste.

Landfills and WWTPs are highly interdependent, and both are vital to Washington communities. Many landfills rely on WWTPs to manage their leachate. WWTPs, in turn, increasingly rely on landfills for biosolids management. Efforts to address PFAS at landfills and WWTPs must avoid disrupting this interdependence, especially as studies have shown that landfills may serve to sequester long-chain PFAS compounds.² If landfills must curtail accepting biosolids and filter media from WWTPs to avoid receipt of materials containing PFAS, or if WWTPs choose to limit their acceptance of landfill leachate, those waste streams will be stranded. Ecology thus needs to acknowledge the critical role both landfills and WWTPs have in the future management of PFAS-contaminated waste.

Comment 3. The CAP mischaracterizes landfills as sources of PFAS.

The CAP incorrectly characterizes landfills as potential *sources* of PFAS, creating the impression that landfills are similar to manufacturers of products with high concentrations of PFAS like AFFF or carpet treatment agents. For example, Section 4.0 of the CAP’s Executive Summary states, “Waste streams generated in residential and commercial settings are treated in WWTPs or sent to disposal facilities such as landfills, which in turn can re-emit PFAS to the environment.” Likewise, Section 2.3 of the CAP places landfills at the top of its list of “sources” of PFAS. Unlike the other listed “sources” (*e.g.*, manufacturers of waterproof leather shoes and car washes), landfills do not use PFAS as part of their processes; rather, landfills are *receivers* of these compounds that are generated and used by manufacturers and consumers.

The CAP’s discussion of landfills only as potential sources of PFAS contamination fails to acknowledge that modern, properly-managed, engineered Subtitle D and C landfills can serve as environmentally secure means for long-term management of PFAS wastes, especially where landfills produce no offsite discharge of leachate or utilize additional leachate treatment technologies onsite. *See, e.g.*, Draft Interim Guidance at 58 (“[L]andfills constructed with environmental controls (bottom liner, leachate collection system, gas collection system, and final cover system, among other controls) manage the release of contaminants into the environment.”). In this capacity, landfills are instrumental in serving as effective containment methods for PFAS wastes, especially in instances where landfills either produce no leachate or operate as closed-loop systems that recirculate any leachate that is generated.

As noted above, WMW is committed to its role of providing management and disposal services of producer streams of materials containing PFAS in a manner that is protective of human health and the environment and is interested in working closely with Ecology in evaluating and understanding landfills as a preferred disposal option for this family of emerging contaminants.

² *See PFAS Waste Source Testing Report*, SANBORN, HEAD & ASSOCIATES, INC. (Oct. 2019) at 2, at <https://anrweb.vt.gov/PubDocs/DEC/SolidWaste/OL510/OL510%202019.10.15%20NEWSVT%20PFAS%20Source%20Testing%20Rpt%20-%20Final.pdf> (finding that “a small fraction of the PFAS entering the landfill in wastes leave it in leachate versus what is sequestered).

Comment 4. The CAP should include additional recommendations for managing PFAS wastes.

Ecology’s “Persistent Bioaccumulation Toxins” regulations in Chapter 173-330 WAC include the following requirement that the CAP should consider in determining how to manage PFAS wastes:

Chemical action plans will include, as appropriate, the following types of information, evaluations and recommendations: ... Recommendations for ...
(ii) Managing products or wastes that contain the specific PBT or group of PBTS addressed in the CAP....

WAC 173-333-420(1)(f)(ii). While the CAP includes recommendations relating to PFAS in waste, the discussion focuses on assessing whether WWTPs and landfills are potential sources of PFAS contamination rather than evaluating and recommending how to manage PFAS wastes. For example, Section 4.2 recommends evaluating PFAS emissions in leachate, groundwater, and landfill gas; yet, it does not evaluate how landfills can be used to provide secure long-term disposal of PFAS waste.

To meet the directives of WAC 173-333-420, Ecology should address how landfills – whether Subtitle C, Subtitle D, or others – can provide long-term management of PFAS wastes. In addressing this requirement, WM encourages Ecology to review and incorporate, where appropriate, Sections 3.b.ii-iv of the Draft Interim Guidance for more information on the efficacy of engineered landfill components in containing PFAS, both from leachate discharge and landfill gas emissions.

Comment 5. The CAP should avoid creating the impression that landfills are major sources of PFAS in wastewater that are managed at WWTPs.

While the CAP does discuss WWTPs as potential receivers of PFAS and also as potential sources of discharges of PFAS to the environment, the CAP fails to present data on the quantity of wastewater managed through Washington’s 600+ WWTPs relative to the quantity of influent received from landfills. While this omission standing alone is not noteworthy, it is relevant because the CAP does present data on landfill leachate production for several landfills. See Table 32. By doing so, the CAP gives the misleading impression that landfills are major sources of the wastewater being managed through WWTPs and therefore are potentially large sources of PFAS to the WWTPs.

In fact, landfill leachate is a very small portion of WWTP influent for those very few WWTPs that receive landfill leachate. For example, King County’s regional WWTP system treats an average of 178 million gallons per day (mgd).³ The Cedar Hills Landfill – the county’s largest – generates a maximum of 2.7 mgd⁴ – roughly 1.5% of the total amount treated. By including data on landfill leachate production without providing information as to how much wastewater is generated by other sources – including from manufacturers of products with high

³ See “Facts About the King County Regional Wastewater System,” KING COUNTY NATURAL RESOURCES AND PARKS WASTEWATER TREATMENT DIVISION, at <https://www.kingcounty.gov/depts/dnrp/wtd/system/facts.aspx> (last visited Jan. 19, 2021).

⁴ See *Cedar Hills Regional Landfill 2019 Annual Report*, KING COUNTY DEPARTMENT OF NATURAL RESOURCES AND PARKS SOLID WASTE DIVISION (May 2020), at <https://your.kingcounty.gov/dnrp/library/solid-waste/facilities/CHRLF-annual-report-2019.pdf> (last visited Jan. 19, 2021).

concentrations of PFAS – the CAP fails to acknowledge that landfill leachate is a very small portion of the incoming wastewater stream and likewise a very small contributor to the PFAS received at WWTPs. WM thus encourages Ecology to revise the CAP consistent with the comprehensive studies conducted in Michigan and North Carolina that have provided proper context by concluding that non-landfill sources are the most significant mass contributors for PFAS to WWTPs.⁵

Comment 6. WMW supports Ecology’s focus on the need to control PFAS contaminants at their source.

WMW strongly supports the CAP’s recommendation to focus efforts on reducing the use of PFAS in products, cleanup high-risk PFAS sites, and control PFAS at the point of exposure, such as in drinking water and foods. To make significant progress in reducing PFAS exposure, it is imperative to discontinue and phase-out PFAS production and use at manufacturing facilities and find safer alternatives for heavy-use areas such as firefighting training sites. As long as PFAS are elements of products used in our everyday lives, and background levels resulting from decades of manufacturing and use persist, these chemicals will continue to be found in “receiver” waste streams. As such, WMW supports Ecology’s working proactively with industry, manufacturers, and businesses to eliminate PFAS in AFFF and manufacturing processes using PFAS.

Comment 7. Ecology should provide additional discussion on the proper disposal of wastes containing PFAS that exceed the threshold for dangerous waste classification.

The CAP includes PFAS concentration data for numerous common household and/or commercial products. *See* CAP at 186 – Tables 41 & 42. The CAP also notes that “PFAS present in a waste above 100 ppm must be properly managed and disposed as dangerous waste (WAC 173-303-040).” *Id.* at 174. For some of the listed products – *e.g.*, cleaning agents, commercial carpet care liquids, treated floor waxes and stone/wood sealants, impregnating sprays, and waterproofing agents – the reported concentrations exceed the 0.01% halogenated organic compounds (HOC) threshold for triggering dangerous waste requirements. Once these materials no longer serve their intended purposes and become wastes, they will have to be managed in accordance with Chapter 173-303 WAC.

While some of these materials may be managed under the household hazardous waste exemptions or small quantity generator requirements, there may be large commercial sectors that will have to manage certain materials containing PFAS as dangerous wastes. Yet, the CAP provides minimal discussion of how these large quantities and varied products will be disposed of, especially if many of the common products trigger dangerous waste requirements. As discussed above in Comment 4, Ecology’s regulations specify that the CAP should address the management of PFAS-containing wastes. WAC 173-333-420(1)(f)(ii) (CAP “will include ...

⁵ *See Collective Study of PFAS and 1,4-Dioxane in Landfill Leachate and Estimated Influence on Wastewater Treatment Plant Facility Influent*, NATIONAL WASTE & RECYCLING ASSOCIATION – CAROLINAS CHAPTER (Mar. 10, 2020), at <https://files.nc.gov/ncdeq/Waste%20Management/DWM/NC-Collective-Study-Rpt-03-10-2020.pdf>; *Statewide Study on Landfill Leachate PFOA and PFOS Impact on Water Resource Recovery Facility Influent Technical Report*, MICHIGAN WASTE & RECYCLING ASSOCIATION (Mar. 6, 2019), at <https://www.bridgemi.com/sites/default/files/mwra-technical-report.pdf>.

[r]ecommendations for ... [m]anaging products or wastes that contain the specific PBT or group of PBTs”). The CAP should be supplemented to address this requirement.

Comment 8. Ecology should seek additional, more refined information on concentrations of PFAS in carpeting used in the United States.

The CAP references a Swedish report⁶ that estimates that treated synthetic carpet “contains up to 15% PFAS”. Using this upper-end value, the CAP then estimates “a total of 430,000 metric tons of PFAS landfilled over a 30 year period.” CAP at 172. The CAP later acknowledges that it received other information that the 15% estimate “is too high” and that a 0.1% value should be used. *Id.* at 174. The CAP also cites another study reporting PFOS concentrations of 0.0075% and a study that reported total PFCA concentrations in pre-treated carpeting to be 0.000243%. *See id.* at 172, 186.

This huge range in PFAS concentrations in carpeting – more than 60,000-fold – renders this information meaningless and alarming. Despite the language questioning the KEMI estimate, including this estimate in the CAP raises concern. First, many will rely on this study and cite to the upper-end estimate that 430,000 tons of PFAS from carpeting have been landfilled in Washington State over the past 30 years. Second, by suggesting that carpeting could contain PFAS concentrations greater than 0.01%, Ecology has suggested that used carpeting destined for recycling or disposal may be classified as a “dangerous waste” under Washington’s Dangerous Waste Regulations. *See* WAC 173-303-100(6)(d). Moreover, if the concentrations were at the 15% level suggested by the KEMI report, carpeting would be not just a dangerous waste, but would actually qualify as an “extremely hazardous waste” because the halogenated organic compound concentration would exceed 1.0%. *Id.*

Comment 9. Ecology’s recommendation to evaluate how different waste streams contribute to PFAS concentrations in leachate is unrealistic.

On page 30, the CAP recommends collecting data from landfills to determine the difference in PFAS concentrations across landfill cells of different ages and whether specific waste streams lead to higher PFAS values. WMW believes that this recommendation, while well-intended, cannot determine with any certainty the data Ecology is looking for nor will it serve to provide reliable information for the leachability of PFAS compounds. WMA encourages Ecology to support and fund academic science to determine what the leachability and transformations these compounds exhibit in landfills versus simply identifying them once they are disposed. Because of the complex and heterogenous nature of municipal solid waste, it is difficult to imagine how Ecology could make such an assessment that identifies meaningful or actionable data.

Comment 10. Section 3.3.3 and Table 30 are misleading and inaccurate by characterizing landfill disposal of PFAS waste as a “contribution to environmental exposure.”

Section 3.3.3 and Table 30 identify several consumer products for additional consideration based on their “environmental release pathways” and “contribution to environmental exposure” associated with disposal in Washington Landfills. Although the CAP appropriately indicates that Ecology should work proactively with industry, manufacturers, and

⁶ *See Occurrence and Use of Highly Fluorinated Substances and Alternatives*, SWEDISH CHEMICALS AGENCY (KEMI) (Jul. 2015).

businesses to eliminate releases of PFAS from concentrated sources, such as AFFF and manufacturing processes using PFAS raw materials, the inclusion of the landfill sector alongside other heavy users is misleading.

First, as noted above, solid waste landfills are merely receivers of societal waste and typically do not manage concentrations of PFAS similar to those that are found at heavy-user sources such as car washes and manufacturers of waterproof leather shoes (ES Summary Section 2.3). Secondly, it is inaccurate to determine that landfill disposal of various PFAS-containing consumer products creates an environmental exposure to PFAS⁷. While this could be true for some landfill types, there is no data available on releases to the environment of PFAS from waste management facilities in Washington state.

The CAP does recognize that the environmental exposure risks to groundwater are associated only with older unlined landfills and that leachate managed on-site does not contribute to PFAS loading at wastewater treatment plants. Landfill disposal of PFAS – especially disposal in landfills with closed-loop leachate management – presents minimal or no environmental exposure to PFAS. *See, e.g.*, Draft Interim Guidance at 71 (“Modern MSW landfills, when constructed with appropriate controls (*e.g.*, liner system and leachate and gas collection and management systems), can also control the migration of PFAS into the environment.”). When properly disposed of in modern, lined, environmentally-engineered landfills with leachate collection systems, especially where the leachate is managed onsite, PFAS will remain isolated from potential environmental and human receptors that could present any meaningful environmental risk. While WMW does not object to Ecology making reasonable estimates of the quantities of PFAS wastes that may be disposed of in Washington’s landfills, WMW requests that Ecology revise this section based on further information on the role of the landfill sector in controlling releases of PFAS waste into the environment.

Comment 11. The CAP is misleading by overemphasizing landfills as a potential source of “uncontrolled leachate” discharging PFAS into the environment and by underemphasizing that most active landfills have leachate collection systems.

The CAP devotes six pages of text to support its introductory statement that “[l]andfill leachate has been recognized as a potential source of PFAS into the environment.” CAP at 168. While the CAP does recognize that “only” MSW landfills and limited purpose landfills have leachate collection systems, its overall discussion portrays landfill leachate as being a significant potential source of PFAS discharged to the environment. This portrayal is misleading and imbalanced. It fails to recognize that the wastes generated in Washington State are predominately disposed of in modern, lined landfills with leachate-collection systems – with some of the largest having closed-loop systems that do not discharge to WWTPs.

For those landfills that do collect leachate and send it to off-site WWTPs, it is misleading for Ecology to single out these landfills as a significant source of PFAS contamination received at WWTPs. As noted above, the contribution of PFAS in landfill leachate is typically very small compared to the total PFAS loads received by WWTPs from other sources. Indeed, comprehensive studies conducted in Michigan and North Carolina have concluded that non-

⁷ For example, under the heading “Contribution to environmental exposure,” Ecology writes, “[a]n estimated 14,300 metric tons of PFAS from carpet end up in Washington landfills annually.”

landfill sources are the most significant mass contributors for PFOA and PFOS at WWTPs.⁸ Even for unlined landfills, studies have shown groundwater contamination levels near landfills are three orders of magnitude lower than concentrations at airports that used AFFF materials.

WMW recommends revising Section 3.4.3 to present a more balanced discussion to indicate that “most” active landfills have leachate collection systems to avoid misleading the reader that “uncontrolled leachate” is a typical occurrence and a potentially significant source of PFAS discharged to the environment. Finally, Ecology’s discussion of landfill leachate is belied by its acknowledgement that “[t]here is no information regarding the incidence of PFAS in landfill leachate in Washington state.” *See* Comment 12 below. While WMW recognizes that landfill leachate will likely contain PFAS from the wastes that they receive, it is premature to generalize about how Washington landfills are a source of PFAS into the environment without consideration of actual leachate data and the potential toxicological risks that these levels present to the environment.

Comment 12. Ecology has data on PFAS concentrations in leachate from Washington’s landfills.

In several areas, the CAP states that Ecology does not have data on the concentrations of PFAS sampled from Washington’s landfills. *See, e.g.*, CAP at 170 & 180. It then recommends undertaking a sampling program to collect data from selected landfills in the state and compare those values with landfills throughout the United States. WMW has provided PFAS leachate sampling data to Ecology and is aware that at least 16 landfills have been sampled as well. WMW also understands that the concentrations of PFAS in leachate from Washington’s landfills are similar to concentrations from other landfills in the United States.

WMW recommends revising this section to discuss the data that Ecology has collected and to evaluate the data that EPA has collected on average PFAS concentrations in different types of landfill leachate, as reported in public studies. *See* Draft Interim Guidance at Table 3-5. Before undertaking an additional round of sampling and data-gathering from Washington’s landfills, Ecology should present the data that it has, see how that data varies compared to other landfills across the country, evaluate the demonstrated health effects these levels present, and only then assess whether gathering more data is warranted.

As such, WMW believes that Ecology’s resources should be directed at source-control by determining the PFAS levels in various products and wastes and how those levels are changing over time rather than gathering even more data from Washington’s landfills. Evidence has shown that exposures to PFAS compounds from the use of products containing these compounds present the highest exposure to humans. For example, the CAP presents PFAS annual disposal tonnage estimates of 52 to 17,043 metric tons – a difference of three orders of magnitude. WMW recommends that Ecology coordinate with EPA’s existing efforts to understand the concentrations of PFAS in incoming waste streams and their toxicological effects before undertaking more data-gathering on landfill leachate.

⁸ *See* note 5, *supra*.

Comment 13. The CAP should revisit its unsupported statement that PFAS can contaminate landfill leachate from the use of AFFF in fighting fires at landfills.

On page 170 of the CAP, Ecology alleges that “PFAS could also enter landfill leachate as a result of fire response using fluorinated foams at a landfill.” Yet, Ecology acknowledges that it has no data to support this speculation. Moreover, landfill fires are a relatively rare occurrence. When they do occur, the more typical fire suppression strategy is to cover burning or smoldering wastes with soils to cut-off the flow of oxygen and starve the fire. There is no basis for Ecology to single out landfills as a source of PFAS contamination from the use of AFFF when such foams have been used more frequently and in larger volumes at numerous other kinds of facilities – in particular, at airports, oil refineries, defense sites. *See, e.g.*, Draft Interim Guidance, Table 2-2 (list of AFFF users and locations does not include landfills).

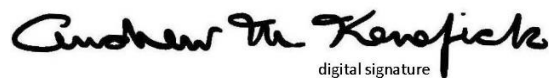
Comment 14. The CAP’s discussion of groundwater and drinking water contamination resulting from improperly-managed landfill leachate warrants more appropriate context.

On page 170 of the CAP, Ecology observes that some studies have found that drinking water sources have been adversely impacted by improperly managed landfill leachate “in particular when landfills accepted manufacturing wastes known to contain high levels of PFAS.” Similarly, in Section 3.0.2, the CAP reports, “Impacts to groundwater are also reported from waste disposal, landfill leachate, land application of industrial sludge, and discharges of wastewater to treatment facilities or septic systems.” These statements lack context because they fail to compare contamination levels at these sites against other sources that have had much greater impacts on drinking water sources.

CONCLUSION

WMW appreciates Ecology’s careful consideration of these comments and requests that the CAP be revised to provide greater balance and context when discussing the landfill disposal of PFAS-contaminated wastes. Rather than discuss landfills as being potential sources of PFAS wastes, the CAP should recognize that landfills receive and do not generate PFAS compounds and that our sector serves as a critical element in reducing environmental and human exposures to PFAS. WMW wishes to extend an open offer to work with Ecology to assist in the safe management of these and other emerging compounds. Thank you and we look forward to discussing these comments further and assisting Ecology in implementation of the final product.

Sincerely,


digital signature

Andrew M. Kenefick