March 14, 2019

Via Electronic Transmission: ghginventory@epa.gov
Regulations.gov

Ms. Rachel Schmeltz
Office of Atmospheric Programs, Climate Change Division
U.S. Environmental Protection Agency (6207-J)
1200 Pennsylvania Ave., NW
Washington, DC 20460

Re: Comments on the 1990-2017 Draft Inventory of U.S. Greenhouse Gas Emissions and Sinks EPA-HQ-OAR-2018-0853

Dear Rachel:

The undersigned organizations representing both private and public landfill and composting facility owners and operators, industry trade and professional organizations, and solid waste consultants (hereinafter referred to as the waste sector) offer the following comments on the U.S. Environmental Protection Agency's ("EPA's" or "Agency's") draft 1990-2017 Inventory of U.S. Greenhouse Gases and Sinks. We appreciated the opportunity to participate in the expert review of Chapter 7, Waste.

We also appreciated the chance to discuss our thoughts and recommendations with you and your contractors regarding issues related to Municipal Solid Waste (MSW) landfills and composting facilities, including (1) the scale-up factor for MSW landfills; (2) the landfill methane oxidation; (3) the compost emission factor; (4) the k-value; and (5) the degradable organic carbon (DOC). We recognize that the Agency did not have the time to respond to several of our recommendations provided in the expert review letter before developing the draft Inventory, so this letter reiterates those comments for the record as well as our commitment to providing our support to the Agency's work to enhance the Inventory.

The waste sector strongly supports the Agency's efforts thus far to update the inventory, and we are pleased that EPA intends to continue its dialogue with stakeholders, academic researchers and landfill experts. We think this is important work and we are particularly pleased that EPA is planning on considering improvements in the Inventory's assumed DOC value, and decay rates used in estimating methane generation at landfills and recognizes the need to update those factors in the Greenhouse Gas (GHG) Reporting Rule.

The Scale-Up Factor for MSW Landfills

Recognizing that the GHG Reporting Program (GHGRP) does not include every MSW landfill in the country – (MSW landfills that ceased taking waste prior to 1980 or have potential emissions less than 25,000 tons CO2e) – we continue to support EPA's decision to use a scale-up factor to estimate emissions from non-reporting landfills in the draft 1990-2017 Inventory. As part of the expert review of the draft 2018 Inventory, the landfill sector reviewed the largest of the Agency's list of potential landfills not reporting emissions to the GHGRP. We found that the Agency overestimated Waste in Place (WIP) by more than 60 percent and recommended adjusting the scale-up factor to 5 percent from 12.5 percent. We were pleased that EPA adjusted the factor for the 2018 Inventory and employed a lower scale-up factor of 9 percent; however, adjusting the scale-up factor to a lower, more appropriate value could be reflected in the 2019 Inventory as the analysis of non-reporting landfills has been accomplished. **We thus recommend that EPA consider using an even lower factor of five percent before finalizing the 2019 Inventory.**

Further, EPA should evaluate and revise the scale-up factor on a routine basis to account for the additional WIP for sites reporting to GHGRP which is likely to significantly exceed non-reporting facilities that have closed and are no longer receiving waste. The Agency can reasonably anticipate a downward trend in WIP at landfills outside the GHGRP, and the scale-up factor should reflect these changing landfill demographics.

Methane Oxidation Factor

For the period 1990 – 2004 in the inventory time series, EPA calculates a national estimate of methane generation and emissions using a combination of secondary data sources that detail the annual quantity of waste landfilled and the annual quantity of methane recovered from facilities with landfill gas collection and control systems. EPA applies a 10% oxidation factor to all facilities for the years 1990 to 2004. This ten percent default factor contrasts significantly with the average methane oxidation factor of 19.5 percent applied through use of GHGRP data, to the later years of the time series (2005 to 2016). Importantly, the 19.5 percent average oxidation rate incorporated in the GHGRP, subpart HH emissions data is premised on a more detailed and up-to-date estimation approach than is the default value of 10 percent. It is also a conservative average value, as the GHGRP methodology restricted the maximum oxidation rate to 35 percent.

In its work to review and revise the method for calculating methane oxidation under subpart HH of the GHGRP, EPA acknowledged the need to update the default 10 percent oxidation value. The default value was based on only one field study, at a landfill without gas collection and control, and did not reflect the much higher oxidation values found in numerous subsequent, peer-reviewed field studies. **Given the plethora of scientific studies showing methane oxidation to be several times higher than the EPA and Intergovernmental Panel on Climate Change (IPCC) default value, we strongly recommend EPA apply a revised value (perhaps the average oxidation value from the GHGRP) to the earlier years of the time series.**

Compost Emission Factor

In ideal conditions, the composting process occurs at a moisture content of between 50 and 60%, but the moisture content of feedstocks received at composting sites varies and can range from 20% to 80%. It is common for moisture to be added to dry feedstocks prior to the start of composting to optimize the biological process. In the calculation of emissions from composting in the draft chapter, it appears that all incoming wastes were assumed to have a moisture content of 60%. If 60% is not reflective of the actual weighted average of all feedstocks, this will introduce errors in the inventory calculation that could be significant.

We recommend that the calculations be based on waste subcategories (i.e., leaves, grass and garden debris, food waste) and category-specific moisture contents, or ask that further information be provided on the rationale for assuming 60% as the average moisture content of all inbound materials.

The k Factor (Methane Generation Rate Constant)

The waste sector strongly supports EPA's plans to assess using k values based on climate and recommends that the Agency review the k-values against new data and other landfill gas models, as well as to assess the uncertainty factor applied to these k values in the Waste Model. We have been concerned that these k-values are outdated and rife with uncertainty, as confirmed by the *Draft AP 42.2.4 Municipal Solid Waste Landfills*, which states:

> *There is a significant level of uncertainty in Equation 2 and its recommended default values for k and L_o. The recommended defaults k and L_o for conventional landfills, based upon the best fit to 40 different landfills, yielded predicted CH_4 emissions that ranged from ~30 to 400% of measured values and had a relative standard deviation of 0.73 (Table 2-2). The default values for wet landfills were based on a more limited set of data and are expected to contain even greater uncertainty.*[1]

The waste sector has previously highlighted the significant issues with the k values used in the Draft AP-42 Section 2.4: Municipal Solid Waste Landfills. In fact, EPA has never finalized AP-42 for MSW landfills, despite the k-value issues identified ***by EPA*** in both AP-42 and the Background Information Document. With uncertainties in CH_4 emissions ranging from -30% to 400% under EPA's assessment of the Landfill Gas Emissions (LandGEM) model, it is difficult to rely on these data. For this reason, we support EPA's plan to review and resolve the significant problems in the k value data set.

[1] U.S. EPA, *Draft AP 42.2.4: Municipal Solid Waste Landfills*, October 2008, p. 2.4-6.

Degradable Organic Carbon (DOC)

Chapter 7 of the draft inventory explains that EPA uses one DOC value of 0.20 to calculate emissions for the years 1990 through 2004, and uses emissions reported through the GHGRP for years 2005 through 2017. The GHGRP allows landfills to use 0.20 for bulk MSW or allows a landfill to further delineate waste streams by accounting for separate shipments of construction and demolition (C&D) waste, which uses a DOC of 0.08, and separate shipments of inert wastes, which may use a DOC of 0.0. If a landfill delineates in this way, it must use a DOC of 0.31 for its MSW waste volumes, which applies an artificially high DOC to MSW, and inappropriately overestimates emissions. The required DOC value of 0.31 fails to account for the significant volumes of C&D and inert wastes that are incorporated in MSW, and which cannot be separated from the MSW or accounted for distinctly, as can discrete shipments of inert wastes from industrial or C&D recycling facilities. Furthermore, neither of the EPA-recommended DOC guidelines have been reviewed in many years**. We therefore support EPA's view that it is time to update the DOC values and believe that the most valuable focus would be to reassess the DOC values incorporated in the GHGRP used for inventory years 2005 forward.**

We are pleased to learn that EPA plans to revisit the DOC value of 0.20, and as we discussed with you, **we strongly recommend focusing first on the later portion of the time series**. We believe that the fundamental shifts in the characterization of waste disposed in landfills has occurred in the later portion of the time series and that the research conducted thus far by state agencies and the Environmental Research and Education Foundation (EREF)[2] are illustrative of those changes. **We also recommend that as EPA revises DOC values used in the second half of the time series the Agency should as a priority, also reevaluate and accordingly revise the DOC values incorporated in subpart HH of the GHGRP, which underpins the data used for those years of the inventory.**

Based on EREF's review of the DOC values for MSW landfills, the waste sector concludes that the long-standing DOC values developed in the past are inaccurate and are likely to over-estimate both landfill gas generation and methane emissions. The data provided by EREF confirms that two trends are driving the changes at MSW Landfills. First, many MSW Landfills are handling less organic matter now, and this trend is anticipated to continue due to state and local organics diversion goals. Second, the increase of Subtitle D non-MSW waste disposed has altered the DOC for all waste deposited in MSW Landfills. EPA validates these trends in the Inventory's Chapter 6 discussion of carbon sequestration of harvested wood products, yard waste and food waste, which shows a significant reduction in sequestered carbon since 1990 due to reduced volumes of organic wastes disposed in landfills.

[2] Staley, B.F. and Kantner, D.L., Estimating Degradable Organic Carbon in MSW Landfills and the Impact of Non-MSW Materials, EREF – Environmental Research and Education Foundation, 2016, Table 1, p.4

Further, as EPA clearly recognizes that the composition of the waste at MSW Landfills has changed and continues to change, we suggest the Agency add an additional factor, "(5) the composition of the waste" to the sentence on line 42, page 7-2 of the waste chapter that begins: "Methane generation and emissions from landfills are a function of several factors."

The waste sector appreciates the opportunity to provide these additional recommendations on enhancing the U.S. GHG Inventory, and we look forward to working with you as you continue to refine inventory practices. If you have any questions, please feel free to contact Amy Van Kolken Banister at (713) 328-7340 or abaniste@wm.com.

Sincerely,

Waste Management
Republic Services
National Waste & Recycling Association
Solid Waste Association of North America
SCS Engineers
Weaver Consulting Group

Cc:
	Sarah Dunham	Dunham.sarah@Epa.gov
	Reid Harvey	Harvey.reid@Epa.gov
	Paul Gunning	Gunning.paul@epa.gov
	Bill Irving	Irving.bill@Epa.gov