March 17, 2017

Via Electronic Transmission: **GHGINVENTORY@EPA.GOV**

Ms. Rachel Schmeltz ***schmeltz.rachel@epa.gov***
US EPA Headquarters
William Jefferson Clinton Building
1200 Pennsylvania Avenue, N.W.
Mail Code: 6207A
Washington, DC 20460

Re: Comments on EPA's *DRAFT Inventory of U.S. Greenhouse Emissions and Sinks: 1990 - 2015*

Dear Rachel,

The undersigned organizations representing both private and public landfill owners and operators, industry trade and professional organizations, and solid waste consultants (hereinafter referred to as the landfill sector) appreciate the opportunity to offer the following comments on the U.S. Draft Inventory of Greenhouse Gas Emissions and Sinks. We have been very pleased with the cooperative effort between EPA and stakeholders to review and update the approach used to estimate greenhouse gas (GHG) emissions from MSW landfills. We appreciate EPA's willingness to listen to our initial concerns and to update the methodology used in in the Draft Inventory for 1990 – 2015 for the MSW Landfill source category. We are especially pleased that emissions data reported by the landfill sector under the Greenhouse Gas Reporting Program (GHGRP) is now being used in the most current GHG Inventory. It is our view that this approach will lead to more accurate emission estimates.

Our comments will cover three issues. First, we are providing comments that support the ongoing preparation of the Inventory of U.S. Greenhouse Gas Emissions and Sinks. Second, we are providing comments on certain items in the MSW Landfill section of the inventory and the MSW landfill appendix. And finally, we are commenting on the need to make further refinements on issues like the DOC values.

1. <u>The Inventory of U.S. Greenhouse Gas Emissions and Sinks is a valuable and necessary data source</u>

The U.S. Greenhouse Gas (GHG) inventory is a credible data source, rather than a policy document, and provides important information, based on sound and transparent methods for many public and private stakeholders. The landfill sector relies on the U.S. GHG inventory for variety of purposes. These include tracking GHG emission trends at the national and state levels, in total and by sector (e.g., waste), and by source category (e.g., MSW landfills). Because the inventory covers the six major greenhouse gases –

carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride – GHG-specific trends in emissions can also be developed at the national and state levels, in total, and by sector, source category. This information is important to private companies seeking to compare their emissions performance to national trends, and to educate customers and communities. The information is also important to public sector waste officials to educate the public and to make more informed decisions about solid waste management planning.

Other stakeholders, including states rely on the U.S. GHG Inventory as a model for developing their GHG emissions data. The inventory data are used in policymaking contexts by Federal agencies, state governments, corporations and trade associations, and non-governmental organizations. In addition, the data are used by investment firms, academics, companies and many others seeking information on GHG emission trends. Scientists also use the GHG inventory data to develop atmospheric models and to compare airplane or satellite emissions monitoring to the GHG inventory's bottom-up approach.

The U.S. GHG inventory provides useful and detailed data on GHG emissions in the United States across many sectors. Since EPA began preparing the U.S. GHG inventory in the early 1990s, the Agency has refined the GHG inventory in several important ways. First, in addition to calculating the emissions each year, EPA also quantifies uncertainties for all source categories, implements quality assurance and quality control, and updates new methodological approaches as needed. Second, over the years the GHG inventory development process has been improved to incorporate significant stakeholder input and transparency. Specifically, EPA has added two opportunities for comment – one for technical experts and the other for the public.

EPA has engaged with industry stakeholders concerned about emission levels, methodological approaches, or other topics related to their sector emissions. In fact, the landfill sector raised such concerns over the last year, and we appreciate EPA's efforts to understand and improve the methodology used to quantify MSW landfill emissions.

2. <u>We support EPA's recalculation of certain MSW landfill data elements in the current Inventory and going forward.</u>

EPA's draft Inventory highlighted data elements that have been recalculated following the stakeholder process held over the past few months. They include (1) using directly reported net CH4 emissions from the 2010 to 2015 GHGRP; (2) applying a scale-up factor to the current GHGRP to account for non-reporting and industrial landfills; (3) back-casting net CH4 emissions for 2005 to 2009, based on the Subpart HH 2010 to 2015 data; (4) recalculating MSW generation and disposal data and CH4 generation estimates

for 1990 to 2004; and (5) merging methodologies for time series consistency. In addition, EPA has developed a list of planned improvements to future year inventories.

We support EPA's use of net CH_4 emissions from the GHGRP.

We strongly support EPA's decision to use landfill-specific emissions data from the GHGRP in the Inventory as we conclude it is more reliable and accurate data for estimating emissions from MSW landfills. In previous comments on this issue, we explained why using GHGRP data is the preferred approach.

- The MSW landfill sector (Subpart HH) emissions data are significantly more detailed and up-to-date than the estimation approach used in previous GHG Inventories;

- Every MSW landfill reporting to Subpart HH is subject to annual validation via EPA review of submitted data – a level of scrutiny that does not occur in the GHG Inventory;

- Each MSW landfill that reports under Subpart HH has a "designated representative," who must certify – under penalty of law – that the data submitted by the site are accurate and developed in accordance with regulatory requirements.

These data provide a more detailed and accurate approach to emissions quantification for the majority of U.S. MSW landfills. Subpart HH data elements include historical and current waste disposal quantities by year, CH_4 generation, gas collection system details, CH_4 recovery, CH_4 oxidation, and CH_4 emissions, and thus, are considered "Tier 3" (the highest quality) data under the *IPCC Guidelines*.

The landfill sector recognizes that the new methodology uses both the first-order decay model and back-casting methods. We agree with EPA's approach of (1) using the actual GHGRP data for years 2010 to 2015; (2) back-casting emissions based on overlap between the GHGRP and the FOD model for the years 2005 to 2009; and (3) using the FOD model with some updates for the years 1990 to 2004. It is our view that this approach leverages the GHGRP data in a useful way, while also recognizing that an over-reliance on GHGRP data in the early years of whole time-series could create uncertainty.

We also agree with EPA's decision to rely on Environmental Research and Education Foundation (EREF) reports on waste disposal, which are to be published every three years. As EPA notes, "data were extrapolated for 2014 and 2015 based on national population growth because no data are available from these sources [State of Garbage

(SOG) or EREF] for those years. Upon publication of the next EREF report, the waste landfilled for 2014 to the current Inventory year will be updated."[1]

Applying a scale-up factor to the GHGRP data.

Recognizing that the GHGRP does not include every landfill in the country – small landfills and industrial landfills do not report to the GHGRP – we support EPA's decision to use a scale-up factor to estimate emissions from non-reporting landfills. In the current U.S. Inventory, EPA has applied a scale-up factor of 12.5 percent to cover the non-reporting landfills, and the Agency also states "this scale-up factor may be revised in future years after a thorough review of available data for the non-reporting landfills is completed."[2]

We are concerned that the scale-up factor of 12.5 may be high, and remind the Agency that we recommended that a scale-up factor of 10.0 would be sufficiently conservative to avoid underestimating emissions. We thus urge EPA to move expeditiously in reviewing emission estimates for non-reporting GHGRP landfills.

We support back casting net CH_4 emissions for 2005 to 2009, based on Subpart HH emissions for 2010 – 2015.

EPA decided to back cast net CH4 emissions only for the period 2005 to 2009, after determining that there was data overlap for a period of years. EPA also considered back casting "throughout the entire time series (back to 1990),"[3] but ultimately concluded that this was not appropriate, given the limited data available in the early years.

The landfill sector supports this decision, recognizing that there is insufficient data in the early years to apply the back-casting approach. However, we note that EPA is applying the 12.5 scale-up factor to the years 2005 to 2009, and we again urge EPA to use a consistent scale-up factor from 2005 to 2015 (and beyond) based on the review of non-reporting landfills.

We support the Agency recalculating MSW generation and disposal data and CH_4 generation estimates for the years 1990 to 2004.

For the period 1990 to 2004, EPA is relying "on the previous methodology, … whereby a disposal factor is applied to nationwide, annual MSW generation amounts."[4] Based on a recent EREF report, "the MSW generation data were modified for the years 1990 – 2013 to reflect recently published data and to align with how MSW quantities are

[1] U.S. EPA, Draft U.S. Inventory, Annex 3.14, p. 393.
[2] U.S. EPA, DRAFT Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990 – 2015, Chapter 7. Waste, Section 7.1. Landfills, p. 7-11.
[3] Ibid., p. 7-12.
[4] Ibid., p. 7-12.

applied under Subpart HH of the GHGRP to estimate CH4 generation." [5] Specifically, EPA revised earlier SOG survey data "to exclude construction and demolition waste and inert materials from the annual quantities of waste generated used in the first order decay model."[6] SOG surveys are available for 2002, 2004, 2006, 2008, 2010, and 2013, and EPA used these data to extrapolate MSW generation for the years 1990 and 2001, and to interpolate for 2003.

The landfill sector supports this methodological approach, as the data show a relatively consistent downward trend, which contrasts with the initial trend line in the Draft Inventory for 1990 – 2014, where CH_4 emissions began increasing around 2002.

The Agency's Merging methodologies for time series consistency appear appropriate.

We have concluded that EPA used the IPCC's methodologies for time series consistency in an appropriate manner. We note that EPA used the "overlap" method during the period when the previous method and the new method could both be applied (e.g., 2010 to 2015), and used the back-cast method, based on the trend lines in 2010 to 2015 data, to estimate CH_4 emissions from 2005 to 2009. Finally, EPA applied its previous method to estimate CH_4 emissions from 1990 to 2004, with certain modifications described in the previous section.

Overall, we find that EPA's revised approach to the MSW Landfill category of the GHG Inventory is much improved, and we appreciate EPA's efforts to update the GHG Inventory estimation methodologies.

EPA's Planned Improvements

As noted previously, EPA is planning to investigate annual waste disposal quantity for landfills that do not report under GHGRP Subpart HH. In addition, EPA "will also investigate options to adjust the oxidation factor for those non-reporting landfills from the default 10 percent currently used, to another value such as those included in the EPA's GHGRP."[7]

The landfill sector strongly supports EPA's plan to adjust the oxidation factor from 10 percent. We note, however, that EPA appears to be considering the use of "another factor" for non-reporting landfills. To the extent most non-reporting landfills are likely to be small, old, or both, we urge EPA to apply appropriate factors to different types of landfills, based on the range of oxidation factors provided in Subpart HH.

[5] Ibid., p. 7-12.
[6] Ibid., p. 7-12.
[7] Ibid., p. 7-14.

It also appears that EPA has decided to revise the long-standing approach of using 10 percent oxidation for all landfills based on the following statement in Annex 3.14:

> Results from this research consistently point to higher cover soil methane oxidation rates than the 2006 IPCC Guidelines default of 10 percent. A continued effort will be made to review the peer-reviewed literature to better understand how climate, cover type, and gas recovery influence the rate of oxidation at active and closed landfills. *At this time, the IPCC recommended oxidation factor will continue to be used for all landfills for the years 1990 to 2004.* (emphasis added)

We support EPA's decision to use the oxidation factors currently being used in Subpart HH for the years 2005 to 2015. Further, it seems reasonable to change oxidation factors in the 1990 – 2004, as the non-reporting facilities are largely old small closed landfills with final cover material compatible with RCRA Subtitle D requirements, which took effect May 1991.

3. <u>We urge EPA to make additional enhancements in next year's inventory, particularly with respect to the DOC factor and L_o.</u>

<u>EPA should review and incorporate updated DOC values, based on EREF's research.</u>

As noted in our previous comments related to key revisions in the Draft Inventory for 1990 – 2015, we urge EPA to develop updated DOC values, based on research provided by EREF. We recommend that EPA acknowledge that the long-standing default DOC values are obsolete and initiate a process to update them. Per EREF:

> The implicit assumption with a guideline value … is that the types and proportion of MSW materials, both degradable and inert, is relatively constant and uniform. If the proportions of either degradable or inert waste materials going into a landfill changes, the fraction used in the DOC calculation may also change and potentially result in a different DOC value. In such instances, the DOC guidelines would yield estimates of landfill gas emissions that are less representative of real-world conditions. An additional complicating factor in the use of a single representative DOC value as a guideline is that, in addition to MSW, MSWLFs in most states may accept one or more non-MSW Subtitle D wastes. …[8]

As EREF has explained to EPA during the recent MSW landfill stakeholder process, for MSW-only landfills, EREF's analysis found that "an average DOC_{MSW} of 0.184 was computed from the state study data, with values ranging from 0.142 - .209. "[9] A default

[8] Staley, B.F. and D.L. Kantner, Environmental Research and Education Foundation (EREF), "Estimating Degradable Carbon in MSW Landfills and the Impact of Non-MSW Materials," 2015, p. 2.
[9] Ibid., p. 6.

value of 0.2028 is the DOC value currently used in the CH4 generation estimates from MSW-only landfills.

EREF also analyzed non-MSW materials going into MSWLFs, and notes that "Given a third of incoming waste to MSWLFs consists of non-MSW materials, there is significant potential for non-MSW materials to impact the relative fraction of organics and degradable organic carbon (DOC) of the MSWLF waste stream."[10]

Based on this analysis, EREF concludes:

> The average computed DOC value for MSW waste using state data was 0.184, or roughly three-fifths of the MSW guideline value. The average computed DOC value for bulk waste using state data was 0.161, or roughly four-fifths of the bulk waste guideline. This analysis suggests that the U.S. EPA's guideline DOC values of 0.31 for MSW-only landfills and 0.20 for facilities accepting non-MSW Subtitle D wastes overestimate DOC at these landfills and, as a result, may result in inaccurate estimate of landfill gas generation and methane emissions.[11]

We recognize that EPA has not yet engaged in updating the DOC, L_o, and k values, and we also note that EPA has determined that "a value of 100 m^3/Mg appears to be a reasonable best estimate to use in the FOD model for the national Inventory for years 1990 through 2004, and is the value used to derive the DOC value of 0.2028."[12]

At the same time, we strongly urge EPA to begin updating the DOC default values next year, focusing on the years 2004 to 2015. EREF's research shows that changes in the waste stream disposed in landfills over the last decade – specifically, the decline in organics and the increase in non-MSW waste in MSW landfills – have led to DOC values that are lower than in previous years.

Based on EREF's more recent research, particularly with respect to the decline in organic waste going into landfills, we recommend that EPA to review the information available in the GHGRP to determine whether data in that dataset would be more useful. Presuming that Subpart HH contains the necessary data elements, it may be possible for EPA to develop a more scientifically sound approach to updating the DOC values, which would rely on significantly more landfills.

[10] Ibid., p. 9.
[11] Ibid., p. 13.
[12] U.S. EPA, Draft U.S. GHG Inventory, p. A-395.

The landfill 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 Kerry Kelly at (202) 639-1218 or kkelly@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