

# Impact on the Waste Industry from Proposed EG and Supplemental NSPS Rules for Landfills

**A&WMA's 109<sup>th</sup> Annual Conference & Exhibition**

New Orleans, Louisiana

June 20-23, 2016

**Extended Abstract # 1091**

**Cassandra B. Drotman, Raymond H. Huff**

SCS Engineers, Long Beach, California,

**Patrick S. Sullivan**

SCS Engineers, Sacramento, California

## INTRODUCTION

Since the New Source Performance Standards (NSPS) and Emission Guidelines (EG)<sup>2</sup> for landfills [40 Code of Federal Regulations (CFR) Part 60, Subparts WWW and Cc]<sup>1</sup>, were first promulgated in 1996, the landfill industry has significantly evolved in its ability to collect and control landfill gas (LFG) emissions. To date, the rules have produced more than a 38% reduction in landfill methane emissions between 1990 and 2013 according to the Environmental Protection Agency's (EPA's) *Inventory of U.S. Greenhouse Gas Emissions and Sinks*<sup>2</sup>.

Proposed revisions to the NSPS and EG rules are currently under consideration by EPA. These rulemakings include the proposed Emissions Guidelines and Compliance Times for Municipal Solid Waste Landfills (Proposed EG) (80 F.R. 52100, August 27, 2015) under 40 CFR Part 60, Subpart Cf<sup>3</sup> and the supplemental proposal to the Standards of Performance for Municipal Solid Waste Landfills at 40 CFR 60, Subpart XXX (Supplemental NSPS) (80 F.R. 52162, August 27, 2015)<sup>4</sup>. Through this regulatory action, EPA is looking to change the way landfills are operated, maintained, and monitored with respect to LFG emissions control beyond the existing rules.

This paper details the Proposed EG and Supplemental NSPS rules, both from the perspective of what is being changed as well as what is proposed to remain the same, including EPA's rationale for these determinations. The Proposed EG and Supplemental NSPS rules will continue to regulate LFG emissions, but the emphasis will be on reducing methane (i.e., greenhouse gas, GHG) emissions on top of non-methane organic compound (NMOC) emissions. In addition, the paper assesses how solid waste landfills will be affected and the impacts which will arise from the Proposed EG and Supplemental NSPS.

## NMOC THRESHOLD REDUCTION

As noted, the proposed rules retain some standards from the NSPS Subpart WWW regulation, such as the current design capacity threshold of 2.5 million megagrams (Mg) and 2.5 million cubic meters (m<sup>3</sup>). However, they also propose changes to the standards by lowering the non-methane organic compound (NMOC) threshold for triggering the requirements for installing and operating a LFG collection and control system (GCCS) from 50 Megagrams per year (Mg/year)

to 34 Mg/year except existing, closed sites as defined in the rule under the closed landfill subcategory (for which the threshold will stay at 50 Mg/year). The significant reduction to the NMOC threshold will require more landfills to install GCCSs that may not have otherwise while forcing other landfills to install GCCSs earlier than previously required.

Previously, the EPA evaluated the cost and benefit between reducing the NMOC emissions threshold from 50 Mg/year to a level between 40 Mg/year and 34 Mg/year at both open and closed landfills. With either of the proposed reduced NMOC emission thresholds, a landfill which exceeds the threshold would be required to install and start up a GCCS within 30 months. The Proposed EG was consistent with existing EG requirements that the LFG can be controlled by a non-enclosed flare, an enclosed combustion device, or a treatment system that processes the collected LFG for subsequent sale or beneficial use.

NMOCs constitute less than one percent of LFG, while methane (CH<sub>4</sub>) represents approximately fifty percent of LFG. EPA uses the Intergovernmental Panel on Climate Change's (IPCC's) Fourth Assessment Report<sup>6</sup> which reported the global warming potential (GWP) of CH<sub>4</sub> as 25 times more potent a GHG than carbon dioxide (CO<sub>2</sub>) over a 100-year period. Based on the CH<sub>4</sub> makeup of LFG and with the amplified GHG effect, the EPA wrote the proposed rules to limit CH<sub>4</sub> emissions to supplement and expand on the existing NSPS/EG rules, which were designed for NMOC reductions. Therefore, EPA is using the NMOC threshold in the Supplemental NSPS rule not to reduce only NMOC's but as an indirect way to reduce CH<sub>4</sub> emissions.

This methane reduction appears to be the centerpiece of EPA's plan to further regulate LFG emissions nationally. The impact of a lower threshold will be an increase in active landfills required to install a GCCS as well as the earlier installation of GCCSs. The total number of landfills impacted is unknown as there is no way to know the number which will test out by completing a Tier 2 or using the proposed new Tier 4 (surface emission monitoring alternative) discussed below. This earlier installation timeline is an example of the increased regulatory burden that landfills will face.

## **DEFINITION OF LFG TREATMENT**

The definition of LFG treatment has reverted to the original definition from an earlier rule proposal of just filtration, dewatering and compression, without numeric limits or special monitoring. EPA has added a notation that beneficial use can include technologies beyond combustion, such as vehicle fuels, pipeline quality gas, etc. This notation will greatly increase the additional beneficial use projects, which will qualify to use the treatment exclusion compared to a rigid definition of treatment that could negatively impact existing and new projects with additional costs and new compliance issues.

The Proposed EG also provides an alternative definition of LFG treatment based on specific numerical values for a filtration and dewatering, on which they are seeking comment. The rule further includes a requirement for each regulated landfill to develop and submit for approval a treatment system monitoring plan requires that the owner/operator develop a site specific treatment plan, to address treatment criteria. The plan would identify monitoring parameters, develop site specific treatment systems monitoring plan, and keep records to demonstrate that such parameters effectively monitoring filtration, de-watering, and compression systems

performance necessary for end use for treated LFG. However, the concern is that the plan could give states and local agencies the ability to require numeric limits and monitoring on a site by site basis. Since EPA is also seeking comment on whether to consider numeric limits, they have not completely given up on the concept.

The update to the definition of treatment allows flexibility to use treatment to demonstrate compliance, which is a positive step for beneficial use of LFG. Conversely, the monitoring plan approval process by state and local agencies and EPA's continued evaluation of numerical values as an alternative would have negative impacts on LFG treatment and beneficial use.

## **CHANGES TO SEM REQUIREMENTS**

Per the proposed rules, all penetrations to the landfill cover and open areas of the cover must be monitored during each quarterly SEM event. Also, latitude and longitude must be recorded for each location of exceedance within +/- 3 meters. Monitoring all penetrations can add significant time and cost to quarterly SEM events, particularly for landfills that have additional penetrations beyond the LFG wellheads. However, EPA considers penetrations to be the largest source of surface emission exceedances; therefore are mandating additional monitoring.

The effect of the updated SEM requirements will incur additional cost from the additional monitoring requirements, equipment, and monitoring penetrations and open areas. In addition, the accuracy of equipment will have an impact on cost as well as modifications to what equipment is currently used. The EPA is requiring that coordinates be in decimal degrees with at least five decimal places. The use of hand-held global positioning system (GPS) devices for flagging SEM exceedances should satisfy EPA's proposed requirements for location data; however, extra efforts and cost will be incurred to plot these locations on SEM maps.

There is also concern on the wind speed and rainfall requirements and proposed measurement directives associated with SEM events used to satisfy Tier 4 monitoring events, which is discussed in more depth in the Use of Tier 4 SEM Procedures for Delaying GCCS requirements below.

## **REMOVAL OF WELLHEAD LIMITATIONS FOR OXYGEN AND TEMPERATURE**

EPA has proposed removal of the wellhead criteria for oxygen and temperature. Oxygen and temperature monitoring will still be required monthly, but no limits or exceedances will exist. Alternative timeline requests have been clarified as only being required if the exceedance cannot be corrected in 15 days and the remedy will not be complete within 120 days and/or will not include expansion of the GCCS. EPA is seeking further comment on this issue as well.

Removing the oxygen and temperature requirements will eliminate the vast majority of wellhead exceedances and avoid the situation of operating the GCCS to meet arbitrary wellhead criteria rather than to minimize emissions.

This elimination of the oxygen and temperature requirements will eliminate higher operating values (HOVs) and timeline request and approvals, as well as reduce cost for recordkeeping and reporting.

## **USE OF TIER 4 SEM PROCEDURE FOR DELAYING GCCS REQUIREMENTS**

A new Tier 4 methodology has been proposed to assess whether a GCCS is required once NMOC emissions exceed 34 Mg/year. The procedure includes four quarters of SEM with no allowed exceedance of the 500 parts per million by volume (ppmv) threshold for methane and then semi-annual SEM after the initial monitoring. The monitoring must include the entire landfill surface path at no more than a thirty meter interval; visual observations to indicate elevated concentration of LFG, and all cover penetrations and open areas. Monitoring under the Tier 4 must be conducted during wind conditions less than 5 miles per hour (average) and/or 10 miles per hour instantaneous, and wind speed monitoring by an onsite anemometer with continuous recorder for the entire duration of the monitoring SEM event is required. The procedure can also be used as one of the criteria when a GCCS can be removed from a landfill or landfill area.

This Tier 4 methodology will allow existing landfills to test out of the regulatory requirements, however, any reading at or above 500 ppmv requires GCCS installment with no corrective actions allowed. A site cannot go back to one of the other testing methods (Tier 1, 2, or 3) if Tier 4 SEM monitoring fails. Sites with and without existing GCCSs can use Tier 4 to test out of requirements.

It is unclear whether the Tier 4 methodology will be successful for use in extending the time when the GCCS must be expanded into areas meeting the 2- or 5-year criteria. In general, this is a very positive development, which should be very helpful for dry climate, or low gas-producing landfills, which only triggered the GCCS requirements due to a high NMOC concentration during Tier 2 testing and/or model defaults that over-predict LFG generation. However, the wind speed requirement and the fact that one single exceedance can cause a failure of the Tier 4 may limit its value.

## **REQUIREMENTS FOR LOW GAS PRODUCING AND CLOSED AREAS**

As closed or low producing areas at active landfills may not produce as much LFG, the EPA has proposed alternative criteria for consideration for removal of a portion of the GCCS at such sites if they meet each of three criteria: (1) the landfill is closed or an area of an active landfill is closed; (2) GCCS must have operated for at least 15 years or the landfill owner or operator can demonstrate that the GCCS will be unable to operate for 15 years due to declining gas flows; and (3) the landfill owner or operator demonstrates that there are no surface methane emissions of 500 ppm or greater in the landfill or closed area for 4 consecutive quarters.

The Proposed EG rule does require that exclusion of or partial GCCS decommissioning for “nonproductive physically separated (i.e., separately lined) closed areas.” EPA “considers areas to be physically separated if they have separate liners and gas cannot migrate between the separate areas.” The inclusion of the “separately lined” concept greatly decreases the usefulness

of this option as liners are designed and installed at the beginning of a landfill areas lifespan and cannot be added later. As LFG travels from high pressure to low pressure, LFG will migrate from closed areas to open areas which are under negative pressure. A separate liner should not be necessary to demonstrate a low gas producing or closed area meets the criteria for GCCS removal.

For closed landfills which do not produce as much LFG, the EPA has proposed a separate subcategories for landfills that closed on or before August 27, 2015. Landfills in this category will continue to be subject to the NMOC emission threshold of 50 Mg/year for determining when controls must be installed or can be removed. The aforementioned criteria for low producing areas also apply to the removal of a GCCS system at a closed landfill.

This proposed provision provides some additional flexibility for eliminating GCCS requirements in these closed and low gas-producing areas, but it is unclear how difficult it will be to meet all of the stated criteria.

## **CHANGES TO STARTUP, SHUTDOWN, AND MALFUNCTION (SSM) REQUIREMENTS**

Landfills currently follow 40 Code of Federal Regulations (CFR) Part 63 Subpart AAAA, National Emission Standards for Hazardous Air Pollutants (NESHAPs)<sup>5</sup>, which was initially promulgated in 2003. All NSPS and EG landfills subject to the GCCS requirements must comply with the landfill NESHAPs. Currently this includes preparing, following, and maintaining a SSM plan or the GCCS. The currently NSPS rule (Subpart WWW) has a compliance exemption under 40 CFR60.755(e) which states “The provisions of this subpart apply at all times, except during periods of SSM, provided the duration of the SSM shall not exceed 5 days for collection systems and 1 hour for control devices.” This exemption can be used in conjunction with the NESHAPs SSM requirements.

The Supplemental NSPS (Subpart XXX), the EPA proposes to remove the existing NSPS Subpart WWW exemption and the standards will apply at all times, including SSM. This would remove the former SSM “exemption” that was contained within the existing NSPS rule and allowed landfills to avoid the loss of SSM protections that other sources faced due to legal decisions regarding the NESHAPs. EPA has eliminated the duration of SSM events (e.g., five days for GCCS and one hour for control devices), noting that it is common for SSM events to go beyond these timeframes. However, landfills still must control free venting to less than one hour by shutting down gas mover equipment once a control device goes offline. EPA proposes no alternative standards during SSM; however, they are seeking comment on whether such alternatives are feasible.

In the Proposed EG rule, EPA has defined a new term of “not operating” to clarify what would be considered SSM events for landfills, as in the GCCS is not operating. EPA’s focus seems to be primarily on malfunctions of the GCCS control device and GCCS monitoring equipment. EPA has defined the concepts of “normal” or “usual manner” for periods of startup and shutdown since those events are expected to be part of the normal GCCS operation cycles. Unfortunately, SSM events could become deviations; and lead to potential notice of violations

(NOVs), fines, and excess emission fees. In addition, landfills would be required to calculate excess NMOC emissions during periods of SSM.

Landfills only emission limitation which applies is for NMOC emission from LFG control devices. As such, the SSM clarification should focus on operation of LFG control devices during periods when the LFG is routed to them via the GCCS. GCCS's are not subject to any emission limitations as they are subject to a design and operation standard that includes periods of downtime for repairs, expansion, upgrades, and maintenance. During periods of GCCS downtime, all valves to the atmosphere are closed, and LFG is not routed to control devices or treatment systems. The language in proposed rule may be interpreted to require operation of the GCCS at all times. For periods of downtime, estimating excess NMOC emissions to the atmosphere would be infeasible as no LFG is being collected.

EPA has suggested that good faith efforts to comply and minimize emissions during downtime could reduce the enforcement burden. It is clear EPA wants to make landfills similar to other sources, which have lost their SSM protections. However, such a decision fails to recognize the unique nature of landfills as a source. While EPA suggests that there may be ways that landfills can limit/avoid violations and enforcement actions for SSM events; this provision creates a presumption of excess NMOC emissions and potential deviations during SSM events.

The proposed SSM changes will have significant changes to operation and maintenance of a landfill GCCS. If interpreted that a period of SSM could create a violation or a GCCS has to be operational at all times, significant infrastructure, operator hours, and effort will have to go into the operation of a landfill and generate a tremendous cost to system operation. It would also create problems on how maintenance, expansions, and upgrades be performed. Landfills with GCCS limited by LFG generation and unable to qualify for GCCS removal would be hit significantly hard by this interpretation.

## **DESIGN PLAN PREPARATION AND APPROVAL**

The proposed rules are updating the GCCS design plan requirements for modification as well as requesting comment on third party certification program in lieu of EPA/State review and approval. A revised GCCS Design Plans would be required under two situations: (1) expansion of the GCCS into a new area not covered by a previously approved plan must be submitted within 90 days; (2) prior to installing or expanding the GCCS in a manner other than one described in a previously approved GCCS.

This creates uncertainty for plans that are not already approved and that are not approved when amended. A third party process would also create additional cost but would allow for plans to be approved. Impact to sites will be an increased cost to update GCCS plans as well as cost incurred for third party review.

## **ORGANIC DIVERSION AND SOURCE SEPARATIONS**

Organics diversion is not mandated in the rule, but EPA encourages wider organics diversion as a best management practice (BMP). EPA would consider organics diversion as an element of a state plan. However, the EPA is seeking comments regarding organic diversion as part of the

proposed rule. This gives the EPA the ability to add additional provisions in the final version of the rule based on the information submitted as part of the organics diversion comment request. This deprives the industry of the ability to comment directly on any new rule language.

It should be noted that each landfill manages and disposes of the material they receive in a unique manner and although many of them may own or operate separate collection services for organics, it is not the landfills role or business to implement, enforce, or develop policies associated with such practices.

Although not included in the proposal, EPA's willingness to consider organics diversion as part of a state plan is still troubling and misplaced. This could not only incur tremendous financial impacts but feasibility in many instances may not be practical.

## **SUMMARY**

The Supplemental NSPS and Proposed EG are going to significantly modify operations and maintenance at landfills. The proposed rules both increase the stringency for installation of a GCCS system as well as providing the Tier 4 method to postpone GCCS installation. Overall, there is expected to be a significant increase to the monitoring requires, data collection requirements, and cost of operating a landfill. Some flexibility is given with the new proposed definitions and removal of a few requirements which will slightly lessen the increased requirements in other areas.

EPA has proposed the final rules will be published in July 2016. It is yet to be seen what the cost of the proposed rules updated monitoring and recordkeeping requirements will be. The landfill industry will need to wait and see how the promulgated rules affect landfills both in the near- and long-term.

## **REFERENCES**

1. Code of Federal Regulations Title 40 Part 60 Subpart WWW
2. USEPA, 2015. Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2013, Washington, D.C.
3. Federal Register, Title 40 Part 60 Emission Guidelines, Compliance Times, and Standards of Performance for Municipal Solid Waste Landfill; Proposed Rules, 2015a.
4. Code of Federal Regulations Title 40 Part 60 Subpart XXX, Standards of Performance for Municipal Solid Waste Landfills; Proposed Rule
5. Code of Federal Regulations Title 40 Part 63 Subpart AAAA, National Emission Standards for Hazardous Air Pollutants for Source Categories
6. Intergovernmental Panel on Climate Change, 2007. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, 2007.