



Landfills and Air Emissions:

The Clock Has Started for Compliance with New Federal Regulations

This article provides an overview summary of the recently issued updated regulations for controlling air emissions of methane and other pollutants from municipal solid waste landfills.

The U.S. Environmental Protection Agency (EPA) recently issued updated regulations for controlling air emissions of methane and other pollutants from municipal solid waste (MSW) landfills. These rules are referred to as revised New Source Performance Standards (NSPS) for new landfills and Emission Guidelines (EG) for existing landfills. Affecting a large and ubiquitous segment of the U.S. economy, EPA estimates the new air rules will apply to 1,014 existing landfills and 128 new landfills, placing new responsibilities on landfill owners and operators, as well as on state, local, and tribal regulators.¹

For new or expanded landfills, the timeline for compliance with the revised NSPS started on the *Federal Register* publication date of August 29, 2016. For existing landfills, the timeline for compliance with the new EG begins later, possibly fall 2017, after states develop their state-specific compliance plans and EPA has approved those plans. Although similar to the previous rules, the new NSPS/EG regulations differ significantly in important respects for affected landfills and create transition complications due to conflicting guidance and unresolved issues in rulemaking.

Landfills Are Ubiquitous, A typical Emissions Sources

Virtually every American affects, and is affected by, MSW landfills, which are diversely owned and operated by private companies, large to small municipalities, regional entities, and enterprise funds. The sector represents the third largest anthropogenic emitter of methane, a compound currently considered 25 times more potent than carbon dioxide as a climate-forcing chemical. Indeed, EPA's societal cost of carbon emissions as a greenhouse gas was a significant factor in the cost/benefit analysis performed during development of the new landfill NSPS and EG rules.



Landfill gas extraction wellhead.
Courtesy of SCS Engineers.

Landfills differ from typical industrial point sources in that they cannot simply stop emissions by “turning off.” As MSW undergoes biological decomposition, landfill gas (LFG) is generated over time and continues to be generated for many years regardless of whether new waste is accepted for disposal. LFG is composed of approximately 50-percent methane and 50-percent carbon dioxide, with trace amounts of other compounds. Typically, LFG emissions are controlled by extraction, collection, and routing to a flare for combustion. Alternatively, because LFG's methane content makes it similar to a low-grade natural gas, captured LFG can be beneficially employed as fuel to generate electricity or heat.

As landfills entail a continuous biological process, regulations affecting landfill emissions are necessarily different than for typical industrial emission sources. As an example, the trigger pollutant for regulation of landfill emissions is not an individual pollutant, but rather a collective assortment classified as non-methane organic compounds (NMOCs), as well as methane. Further, because LFG generation and emissions characteristics can differ based on site-specific aspects, including local waste composition, the stage of landfill development, and the precipitation amount, the appropriate implementation of these new rules can pose challenges for state, local, and tribal regulators.

New Air Rules

In July 2014, EPA proposed new rules to supplant existing NSPS and EG for MSW landfills, and these new rules were published in final form on July 29, 2016. The new landfill rules will replace the existing rules after a transition period, and key compliance timeframes are discussed below. The rules for new and expanded landfills (i.e., the revised NSPS) are codified under 40 Code of Federal Regulations (CFR), Part 60, Subpart XXX. The revised rules for existing landfills (i.e., the revised EG), are codified under 40 CFR 60, Subpart Cf.

The previous NSPS, 40 CFR 60, Subpart WWW, regulated landfills by subjecting facilities constructed or modified after May 30, 1991, and above a particular design capacity (2.5 million megagrams [Mg] of waste mass and 2.5 million cubic meters [m³] of waste volume) to the regulations, and further required landfills with calculated emissions greater than 50 Mg/yr of NMOc to collect and control LFG. Control typically involved the use of an active LFG collection system to draw LFG into porous piping beneath the landfill surface, collect it, and route to a flare. For landfills that were already existing when the rule was published in 1991, the EG applied (Subpart Cc). Under the EG, state and local regulatory authorities used the EPA guidelines to implement their own rules to regulate the existing landfills.

As a companion to these earlier NSPS/EG rules, EPA had promulgated in 2003 a National Emission Standard for

Table 1. Comparison of old and new landfill rules—primary provisions.^a

| Provision in Rule ^a | Previous NSPS (Subpart WWW) and EG (Subpart Cc) | New NSPS (Subpart XXX) and EG (Subpart Cf) |
|----------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Rule Applicability Trigger | 2.5 million Mg waste mass and 2.5 million m ³ waste volume | No change |
| Landfill Gas Control Trigger—NMOC Emissions Threshold (for active MSW landfills) | 50 Mg/yr | 34 Mg/yr |
| Landfill Gas Control Trigger—NMOC Emissions Threshold (for closed MSW landfills) | 50 Mg/yr | No change |
| Gas Wellhead Monitoring Parameters | Temperature, pressure, oxygen | Temperature, pressure (note: oxygen must be recorded, but is no longer subject to numeric limits or reporting) |
| Frequency of Monitoring Required Gas Wellhead Parameters | Monthly | No change |
| “Wet” Landfills (leachate or other specified liquids are recirculated) | Not addressed | No stated requirements, except recirculated leachate must be recorded back 10 years |
| Surface Emission Monitoring of Methane | Quarterly | Quarterly, with increased requirements including additional cover penetration monitoring and GPS location marking of exceedances with ±4 m accuracy. These additional requirements add significant time and expense for the landfill |
| Landfill Gas Treatment (processing of LFG for subsequent sale for beneficial use) Definition | Unclearified | Clarified: compression, dewatering, and filtration, (states may require monitoring plan) |

Note: ^aNot an exhaustive listing.

Hazardous Air Pollutants (NESHAPs) for MSW landfills under 40 CFR Part 63, Subpart AAAAA, which was officially tied to the earlier NSPS/EG Subparts WWW and Cc rules (§63.1930). Besides incorporating requirements of the NSPS/EG, the NESHAPs brought landfills that recirculate leachate (bioreactor landfills) under regulation and addressed requirements for landfills during startup, shutdown, and malfunctions. This existing landfill NESHAPs, however, was neither revised nor replaced with the recent update of the NSPS/EG.

In many respects, the new NSPS and EG rules are similar to the previous rules. For instance, the landfill size (capacity) threshold for applicability remains identical. However, there are significant differences that a landfill manager needs to understand. Table 1 highlights major changes and similarities between the rules.

Compliance Schedule

The compliance timelines for the new landfill NSPS and EG are summarized in Table 2. For new and expanded landfills subject to the new NSPS, an initial report of landfill design capacity and NMOC emissions was due in late 2016. If the NSPS requires gas control at the landfill, the related design

plan is due by November 2017 at the latest, and the control system must be operating by May 2019. For existing landfills, the states are to develop state-specific requirements for compliance with the new state-equivalent EG. States, tribal, and local jurisdictions will have up to nine months, or until May 30, 2017, to develop their EG rules and EPA has an additional four months to approve or disapprove, ostensibly by September 2017. If this schedule holds, existing landfills with NMOC emissions exceeding 34 Mg/yr, would have until November 2018 to submit gas collection and control system (GCCS) design plans and until May 2020 to install and operate the system.

Issues to Be Resolved

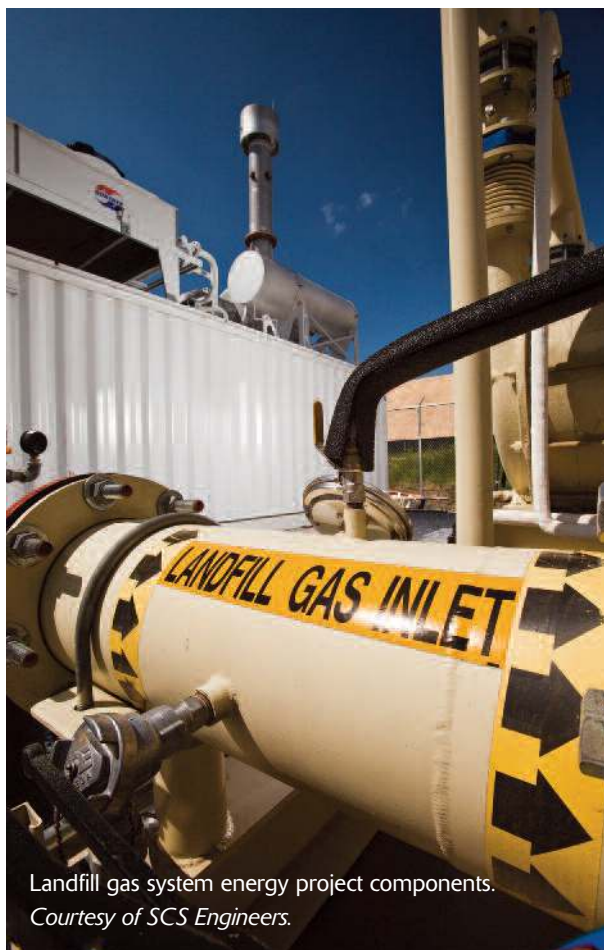
As with any complex regulatory framework, especially one involving both NSPS/EG and NESHAPs rules, requiring state-specific implementation, and affecting such a widespread industry, the issuance of these new rules created a variety of unresolved issues and uncertainty as to how such issues will be resolved. Some primary concerns are outlined below.

- **Simultaneous applicability of old and new NSPS rules.** Normally, an NSPS rule affects new emissions sources on

Table 2. Compliance timelines.

| New/Expanded Landfills—NSPS (Part 60, Subpart XXX) | | Existing Landfills—EG (Part 60, Subpart Cf) | |
|-------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|
| Rule Publication Date | August 29, 2016 | Rule Publication Date | August 29, 2016 |
| Rule Effective Date | October 28, 2016 | Rule Effective Date | October 28, 2016 |
| Design Capacity and NMOC Emission Rate Report Due | November 28, 2016 | State Preparation of EG Compliance Rules | May 30, 2017 at the latest (within 9 months of promulgation date) |
| If NMOC Calculated Emissions Exceed 34 Mg/yr ^a : | For landfills exceeding threshold at the initial NSPS date of July 17, 2014: November 28, 2017 at the latest. For those triggering later: (12 months from the most recent date of NMOC emission rate report) May 2019 at the latest (otherwise, 30 months from the most recent date of NMOC calculation submittal) | Design Capacity and NMOC Emission Rate Report Due | 90 days after exceeding 34 Mg/yr |
| • Submit NSPS GCCS Design Plan | | EPA Approval Period for State/Local EG Rules | By September 28, 2017 at the latest (within 4 months of state submittal; state has 6 months to incorporate EPA comments, if needed) |
| • Install and Operate GCCS Design Plan | | If NMOC Calculated Emissions Exceed 34 Mg/yr ^a : | 12 months from the most recent date of NMOC emission rate report, and after EG state implementation plan is approved by EPA |
| | | • Submit NSPS GCCS Design Plan | |
| | | • Install and Operate GCCS Design Plan | 30 months from the most recent date of NMOC emission rate report, and after EG state implementation plan is approved by EPA |

Note: ^aCalculation methodology as specified in the rules.



Landfill gas system energy project components.
Courtesy of SCS Engineers.

the principle that newer sources can be more readily subject to new emissions technologies and lower emissions standards. Therefore, NSPS rules include a clear date upon which future sources will be subject to the new, more stringent rule and no longer subject to the superseded rule. However, this new NSPS rule is confusing as to whether the old NSPS continues to apply, or has been superseded entirely by the new NSPS as would be normal. This creates uncertainty over whether a landfill could simultaneously be subject to both the new NSPS (Subpart XXX) and the old NSPS (Subpart WWW), an untenable overlapping of new and old requirements. For instance, for a new landfill, when the NMOC emissions threshold of 34 Mg/yr is exceeded, that new landfill becomes subject to the MSW Landfill NESHAPs, a key requirement of which is compliance with old NSPS Subpart WWW/Cc (§63.1955).

- **Electronic reporting.** The new rules mandate electronic reporting to EPA for a variety of rule-required reports. However, EPA's electronic reporting system is not yet capable of accepting all of the required reports, creating confusion as to how to meet compliance requirements for reporting.
- **Gas Collection and Control Design Plan retroactive risk.** Landfills are required to submit design plans for LFG collection and control systems to regulatory authorities for

approval before construction. However, some states either do not issue approvals in a timely manner, or may never issue formal approvals. Because a regulated landfill is on a rigid schedule to install and operate a GCCS, this issue has long needed clarification. The preamble to the new NSPS rule addresses this issue at the federal level, but creates a risk issue for the landfill owner in the process. EPA states that if a regulated landfill does not receive a formal approval from its regulatory authority within a specified period, it can commence construction of the GCCS, but only "with the recognition that they are proceeding at their own risk." Hence, the new NSPS appears to create a legal risk for landfills as they seek to comply with the rule, namely, retroactive liability for an already installed GCCS.

Conclusion

EPA recently established expansive new air rules affecting MSW Landfills. Implementation of the new rules places new responsibilities on both the regulated community and regulators alike. However, some of these responsibilities are unclear and

have created unresolved issues that should be addressed in close consultation now with your state/local regulatory authority. For example, if a landfill is "new," the facility is now subject to NSPS Subpart XXX, which is fully effective. A design capacity and NMOC emissions rate report should already have been submitted. If NMOC emissions from a facility exceed 34 Mg/yr, then the landfill will need to submit a GCCS design plan within 12 months of the date of exceedance and install and operate within 30 months (no later than May 2019 for those triggering with the promulgation of the rule). If a landfill is an "existing emissions source," it will be subject to the new EG rule (Subpart Cf). Landfill owners should maintain close contact with their state/local regulatory authority regarding the status of the regulator's state implementation plan, due by November 2017. That state implementation plan will prescribe the required compliance dates for an existing landfill, likely to be no later than the 2018/2020 time period. In either case, owners should become familiar with the rule and stayed tuned as compliance guidance evolves to address the unresolved issues. **em**

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Reference

1. *Final Updates Performance Standards for New, Modified, and Reconstructed Landfills, and Updates to Emission Guidelines for Existing Landfills: Fact Sheet*; U.S. Environmental Protection Agency, 2016.



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