EPA's Air Rules for Municipal Solid Waste Landfills

FINAL UPDATES TO PERFORMANCE STANDARDS FOR NEW, MODIFIED AND RECONSTRUCTED LANDFILLS, AND UPDATES TO EMISSION GUIDELINES FOR EXISTING LANDFILLS: FACT SHEET

SUMMARY OF ACTION

- On July 14, 2016, the U.S. Environmental Protection Agency (EPA) issued final New Source Performance Standards (NSPS) to reduce emissions of methane-rich landfill gas from *new, modified and reconstructed* municipal solid waste (MSW) landfills, updating standards that were issued in 1996. In a separate action, EPA also issued revised guidelines for reducing emissions from *existing* MSW landfills, updating the previous Emissions Guidelines, which also were issued in 1996. Both actions are part of the *President's Climate Action Plan: Strategy to Reduce Methane Emissions*.

- MSW landfills receive non-hazardous wastes from homes, businesses and institutions. As the waste in a landfill decomposes, it produces landfill gas, which includes carbon dioxide, a number of air toxics, and methane—a potent greenhouse gas with a global warming potential more than 25 times that of carbon dioxide. Methane is the second most prevalent greenhouse gas emitted by human activities in the United States, and nearly 20 percent of those emissions come from landfills. Landfills are the second largest industrial source of methane emissions in the United States.

- The combined rules will reduce methane emissions by an estimated 334,000 metric tons, the equivalent of reducing 8.2 million metric tons of carbon dioxide in 2025. The rules also cut carbon dioxide emissions directly, yielding an estimated 303,000 metric tons of additional carbon dioxide reductions.

- Reducing methane emissions is an essential part of an overall strategy to address climate change. Climate change impacts threaten our health—by exposing us to extreme heat waves, degraded air quality, and diseases spread through food, water, and insects—and they threaten our economy by increasing insurance premiums and food prices, and damaging our infrastructure and ecosystems. The most vulnerable among us—including children, older adults, people with pre-existing medical conditions and people living in poverty—are most at risk from the impacts of climate change.

- The final rules also will reduce more than 2,000 metric tons of emissions of non-methane organic compounds, which are measured as a surrogate for landfill gas and include a number of air toxics, along with pollutants that cause landfill odors. Air toxics are pollutants known, or suspected, to cause cancer and other serious health problems.

- EPA determined it was appropriate to update the rules based on significant changes in the landfill industry that have occurred since the initial rules were issued, an improved understanding of landfill gas emissions and public comments.

Requirements of the rules

- The **updated NSPS applies** to landfills constructed, modified or reconstructed *after* July 17, 2014. These landfills are subject to the rule if they have a design capacity of 2.5 million metric tons and 2.5 million cubic meters of waste or more. This is the same as existing design capacity thresholds.
    - EPA estimates that 128 new, modified or reconstructed landfills will be subject to the final NSPS. Of these, 115 landfills will be required to install controls in 2025, based on their projected emissions. The remaining 13 will have to report their emissions.
- The updated **Emission Guidelines apply, through EPA-approved state plans or a federal plan,** to landfills constructed, modified, or reconstructed *on or before* July 17, 2014. These landfills are subject to the guidelines if they have a design capacity of 2.5 million metric tons and 2.5 million cubic meters of waste or more. This is the same as previous requirements.
    - EPA estimates that 1,014 active existing landfills will be subject to the updated Emission Guidelines – the same number that are subject to the existing NSPS and guidelines combined. An estimated 731 of those landfills are expected to be controlling landfill gas in 2025, based on their projected emissions – 93 more than under the previous NSPS and Emission Guidelines. Of the remainder, 77 active landfills will have to report their emissions, while the other 206 landfills are either closed or are expected to close within 13 months after the Emission Guidelines are published in the Federal Register and have non-methane organic compound emissions below 50 metric tons per year.
    - Existing landfills that close prior to the date 13 months after the guidelines are published in the Federal Register will remain subject to the emission threshold of 50 metric tons of non-methane organic compound per year and will have to continue to collect and control gas until their non-methane organic compound emissions fall below 50 metric tons per year.
- In both rules, EPA has determined that a well-designed and well-operated landfill gas collection-and-control system remains the best system of emission reduction for controlling landfill gas.

- Both actions require affected landfills to install and operate a gas collection control system within 30 months after landfill gas emissions reach a new, lower threshold of 34 metric tons of non-methane organic compounds or more per year (written as megagrams in the rule).

This threshold previously was 50 metric tons per year in both the NSPS and Emission Guidelines. Non-methane organic compounds also are referred to as NMOC.

- Landfill owners/operators may control gas by combusting it in an enclosed combustion device (such as a boiler, engine or turbine) for energy generation, by using a treatment system that processes the collected gas for sale or beneficial use, or by flaring it.
- The NSPS and Emission Guidelines also include:
    - Requirements that landfill owners/operators monitor surface emissions of methane quarterly at all areas within the landfill where waste has been placed, and a gas collection system is required to be in place.
    - An optional method, based on site-specific surface methane emissions, for determining when a landfill must install and operate a gas collection-and-control system. Landfills with modeled NMOC emissions between 34 and 50 metric tons per year may use this method to determine whether they need to install a gas collection–and-control system. Landfills that demonstrate that surface emissions of methane are below 500 parts per million do not have to install controls.
    - Clarifications about the uses of treated landfill gas. The final rule makes clear that treated landfill gas may be used not only as a fuel for stationary engines but also for other beneficial purposes, such as vehicle fuel, production of high-Btu gas for pipeline injection, or as a raw material for chemical manufacturing. In addition, the final rule defines treated landfill gas in a way that promotes beneficial use.
    - Requirements that landfill owners/operators monitor temperature and pressure at wellheads on a monthly basis and take corrective action for elevated temperature or positive pressure. The rule retains requirements to monitor nitrogen/oxygen levels on a monthly basis, but requirements for corrective action for these parameters have been removed.
- Production of landfill gas diminishes over time, especially after the landfill is closed. The final rules also include criteria for capping or removing a landfill gas collection-and-control system from all or a portion of a landfill that is producing low amounts of landfill gas. A system may be capped or removed if:
    - The landfill is closed;
    - The gas collection-and-control system has operated for at least 15 years, or the owner/operator can demonstrate that the system will be unable to operate for at least 15 years due to declining gas flows; and
    - The calculated NMOC emissions at the landfill are less than 34 metric tons per year on three successive test dates.

- The rules also makes other clarifications and updates definitions.
- States will have nine months after the guidelines are published in the Federal Register to submit state plans for implementing the final guidelines. The elements of a state plan and the state plan development and review process are described in "Municipal Solid Waste Landfills, Volume 2: Summary of Requirements for Section 111(d) State Plans for Implementing the Municipal Solid Waste Landfill Emission Guidelines," which is available on EPA's website at https://www3.epa.gov/ttn/atw/landfill/landfv2.pdf

EMISSION REDUCTIONS, BENEFITS AND COSTS

- ***NSPS:*** The final NSPS will reduce methane emissions from new, modified and reconstructed MSW landfills by an estimated 44,000 metric tons a year in 2025, the equivalent of reducing 1.1 million metric tons of carbon dioxide. The rule also is expected to reduce carbon dioxide emissions by 26,000 metric tons, due to reduced electricity demand as new landfills generate electricity using landfill gas. The rule also will reduce NMOC emissions by an estimated 280 metric tons.
- ***Emission guidelines:*** The final emission guidelines are expected to reduce methane emissions from existing landfills by 290,000 metric tons a year in 2025, the equivalent of reducing 7.1 million metric tons of carbon dioxide. The rule also is expected to reduce carbon dioxide emissions by 277,000 metric tons due to reduced electricity demand as landfills generate electricity from landfill gas. The rule also will reduce NMOC emissions by 1,810 metric tons.
- Estimated climate benefits of the methane and carbon dioxide reductions in the final rules significantly outweigh costs. Together, the rules are estimated to yield more than $8 in benefits for every dollar spent to comply. Combined climate-related benefits of the rules are valued at $512 million in 2025 (2012$); combined costs are $60 million. That includes:
    - Benefits of $68.3 million in 2025 (2012$) as a result of reductions under the NSPS – more than $10 in benefits for every dollar spent to comply. Nationwide, net costs of the NSPS are estimated at $6 million in 2025 (2012$)
    - Benefits of $444 million in 2025 (2012$) as a result of reductions under the emission guidelines – more than $8 in benefits for every dollar spent to comply. Nationwide, net costs of the emission guidelines are estimated at $54 million in 2025 (2012$)
- The estimated climate benefits reflect a net reduction in climate change damages, which include human health impacts, property damages from flood risk and the value of ecosystem services, among other effects.
- Reductions in other pollutants, including air toxics and ozone- and particle pollution-forming volatile organic compounds, also are expected to yield benefits; however, EPA was

not able to quantify those. Those benefits include reductions in health effects related to fine particle pollution, ozone and air toxics, along with improvements in visibility.

- Costs include the cost of installing and operating a gas collection-and-control system, and at some landfills, the cost of an engine that uses the landfill gas to generate electricity. The costs also reflect the revenues landfills may make by selling electricity generated using landfill gas.

REDUCING METHANE EMISSIONS FROM LANDFILLS

- Regulatory and voluntary programs have helped reduce methane emissions from landfills by 18 percent from 1990 to 2014; however, methane emissions from landfills remain substantial. In March 2014, as part of the President's Climate Action Plan, the Obama Administration issued the *Strategy to Reduce Methane Emissions*, which identified actions that will improve public health and safety while providing more energy and reducing greenhouse gas emissions.

- The strategy called on EPA to propose updates to the NSPS for new and modified landfills and take public comment on whether to update standards for existing landfills, engaging industry and stakeholders on a range of approaches for cutting landfill gases currently being emitted by existing facilities. More than 1,000 MSW landfills in the U.S. currently are subject to either the 1996 emission guidelines for existing landfills or the 1996 NSPS for new landfills.

- The strategy also called on EPA to continue to work with municipalities and landfill owners to advance cost-effective landfill energy recovery projects through the agency's Landfill Methane Outreach Program (LMOP). Created in 1994, LMOP helps reduce methane emissions from landfills by encouraging the recovery and use of landfill gas as an energy resource.

- LMOP forms partnerships with landfill owners, utilities, power marketers, states, tribes and nonprofit organizations to provide technical assistance, share information on best practices, and provide tools and resources to market the benefits of projects to their communities. As of June 2016, LMOP has more than 1,000 partners.

BACKGROUND

- The Clean Air Act requires EPA to review New Source Performance Standards (NSPS) at least every eight years, and revise them as appropriate, for industrial categories that cause, or significantly contribute to, air pollution that may endanger public health or welfare.

- EPA issued the original NSPS and Emission Guidelines for MSW landfills in 1996. The agency proposed amendments to the NSPS and the emission guidelines for MSW landfills in 2002, and 2006 to clarify issues that arose during implementation; however, those proposals were not finalized.

- The law does not require EPA to review Emission Guidelines; however, it allows the agency to do so when circumstances indicate that it is appropriate. EPA determined it was appropriate to review the emission guidelines based on changes in the landfill industry and changes in the operation of landfills since the original guidelines were issued. These include changes in landfill size, trends in gas collection-and-control system installations, and the age of landfills. After its review, EPA decided to update the emission guidelines after finding the level of reductions achievable and the cost of achieving those reductions reasonable.

- In June 2014, EPA announced proposed updates to the NSPS and issued an Advance Notice of Proposed Rulemaking seeking broad public feedback on options for further reducing landfill gas emissions from existing MSW landfills. The agency issued a supplemental proposal in August 2015 to achieve additional reductions of landfill gas from new, modified and reconstructed landfills, and issued proposed updates to the emission guidelines to further reduce landfill gas from existing MSW landfills.

FOR MORE INFORMATION:

- To read today's final actions, visit: http://www.epa.gov/ttnatw01/landfill/landflpg.html.